THE EFFECT OF VISUAL AND AUDITORY COHERENCE ON JUDGMENTS OF TRANQUILITY TO SIMULATED NATURE EXPERIENCES

by

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STATEMENT OF DISSERTATION APPROVAL

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ABSTRACT

Many contemporary work and home environments produce attentional fatigue. One way to recover from such attentional fatigue is to place oneself in environments that promote feelings of tranquility. One way to begin a systematic study of environment-tranquility relations is to frame the research within attention restoration theory (ART).

Tranquility is an important experience of restoration and may be evoked by coherence. Coherence refers to environmental arrangements that are structured in such a way that a setting is easy to understand. Visual and auditory coherence can be nested within two emotional genres: one is "pastoral" and the other is "sublime." It has been proposed that the level of perceived tranquility may vary according to combinations of different coherences. Therefore, the purpose of this study is to examine the effect of visual and auditory coherence on judgments of tranquility to simulated nature experiences.

Participants included 102 students at the University of Utah in summer 2012. Three hypotheses were established and tested using a 1 x 6 repeated measures design.

Tranquility was measured using a 7-point 6-item tranquility indicator. Sublime and pastoral photographs of nature were combined with sublime music, pastoral music, and no music, yielding six conditions. Repeated-measures ANOVA yielded significant differences among different combinations of visual and auditory coherence. These results

lend support to the notion that less sublime auditory - visual combinations provide tranquil experiences and serve a purpose for people who are seeking a particular natural environment to achieve restorative psychological outcomes. Even though the more sublime combinations garnered comments on increased excitement and enjoyment, study found that individuals may want to seek out less arousing environments to optimize restorative benefits.

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CHAPTER I

RATIONALE

Mental fatigue is an unfortunate but common outcome of living in modern urban societies. Kuo and Sullivan (2001a) claim that levels of mental fatigue are higher in urban areas than they are in settings dominated by nature. Because people are working longer than in previous years, they may also be subject to more stress and mental fatigue than before. According to an International Labor Organization study, Americans put in the equivalent of an extra 40-hour work week in 2000 compared to 10 years before. For some people, mental fatigue has become a chronic problem that cannot be simply overcome by a solid night of sleep or taking a nap. Mental fatigue has been associated with negative consequences such as aggression, irritability, impulsivity, and greater proneness to mistakes and accidents (Herzog, Maguire, & Nebel, 2003).

Intentionally exposing oneself to restorative experiences in nature is an important way to manage the effects of mental fatigue (Van Den Berg, Hartig, & Staat, 2007). According to attention restoration theory, ART (S Kaplan, 1995), contact with nature is effective in reducing mental fatigue. Activities that connect people to nature such as camping, hiking, or animals, as well as placing oneself in natural surroundings such as wilderness, prairies, and community parks can have restorative benefits (Kaplan & Talbot,

1983). Microrestorative events such as viewing nature through a window (Ulrich, 1986) and even exposure to rooms with interior plants have been shown to convey restorative effects (Kuo & Sullivan, 2001b).

One important kind of restorative experience is tranquility. Tranquility has been described as an affective state of pleasantness and low activation or arousal (Russell, 1980). Synonyms include calmness, serenity, and peace. It might also be characterized as an affective state of being in comfort, escape from strains of living in the contemplation of nature (Eliovson, 1971). Tranquility may be an important outcome of exposure to restorative environments, but it has received very little attention in contemporary psychology. Tranquility may be best achieved in those settings that offer coherence (Splan, 2011).

The term "coherence" refers to environmental arrangements that are structured in such a way that a setting is easy to understand. A setting is said to be coherent when the visual or auditory elements "hang together" in a meaningful way so that people readily understand when a given setting is perceived as an "organized environment" (Kaplan & Kaplan, 1982; Barbour & Wang, 2002; Blake & Lee, 2005). For instance, the combination of natural landscape and classical music may enable people to come to a better understanding of the environment around them (Le Huray & Day, 1981). When the provided setting is felt to be comprehensible, manageable, and meaningful, people feel coherence in life. Therefore, the combined coherence of a visual and auditory setting may be resistant against mental fatigue, and its role is to help people regain their mental balance, namely the coherent state in terms of psychological function (Moreno, 2000).

In addition, the visual and auditory variables can be nested within two emotional genres: one is ―pastoral" and the other is ―sublime." While pastoral is defined as a visual or auditory environment that represent a peaceful rural life devoid of urban or social influences, sublime refers to a visual or auditory environment that represents the grand scale of nature, so that the sublime may elicit feelings of arousal, awe, or fear. It has been proposed that the level of perceived tranquility may vary according to the combination of different coherences. For example, the combination of sublime landscape and sublime music may engender too much activation, and people may experience greater levels of arousal or anxiety.

Hence, people may not have a tranquil experience with this combination of visual and auditory stimuli. Conversely, pastoral landscapes combined with pastoral music may induce a peaceful state of mind. A setting of different coherence between visual and auditory variables would reduce the organized structure, so that the perceived tranquility may be decreased.

Therefore, the purpose of this study is to examine the effect of visual and auditory coherence on judgments of tranquility to simulated nature experiences.

CHAPTER II

LITERATURE REVIEW

Attention

The modern urban world of continuous, distracting stimuli can impede people's ability to focus on significant concerns. Thus, one frequent topic of psychological research over the past few decades has been the depletion of atttentional resources due to many sources of confusion, uncertainty, and information in ―real-world experience" (Kaplan & Kaplan, 1989). The overload of this reduced capacity stems in part from the wealth of stimulation surrounding people (Posner, 1994; Van Boxtel, Tsuchiya, & Koch, 2010).

For instance, assume that a student is studying on campus amidst many events going on nearby: a sports game is playing, a phone is ringing, and someone is talking loudly and laughing. In addition, he or she must complete four assignments due later that afternoon. The situation may cause the student stress and confusion. This exhausting state of personal affairs has become standard for much of the population. Stress and mental fatigue is often attributed to this high level of stimulation (Kaplan & Kaplan, 1982; Posner, 1994).

These excessive amounts and varieties of stimulation might be considered ―distraction." In modern times especially, a wealth of distraction is pervasive, both

external and internal. While one is successfully paying attention to a particular part of an event, plenty of other things still might be distracting. Research on attention reports that this constant distraction accounts for the fact that people exhibit varying patterns of attention, which produce different effects in different people (Kaplan & Kaplan, 1982; Kaplan, 1992; Kaplan, 2001; S. Kaplan, 1983; Kaplan, 1992; Kaplan & Kaplan, 1982).

To understand how an individual may be distracted by a variety of stimuli and why such experiences can be unpleasant and even stressful, this argument will concentrate on two different mechanisms of attention. One is based on interest (involuntary attention); the other is based on a lack of interest (voluntary attention; S. Kaplan, 1983; Tennessen & Cimprich, 1995; Kaplan, 2001).

Involuntary Attention

This psychological term implies a spontaneous, effortless inhibitory response to sensory or intellectual stimuli based on interest. It refers to attention that requires no effort at all, such as when something exciting happens and people look to discover what is going on. Thus, it comes into play when, out of interest, curiosity, and the like, certain objects (e.g., beautiful scene of nature) and processes (e.g., exploration) capture and hold one‘s attention (Kaplan & Kaplan, 1989). It represents a kind of attention that occurs without conscious effort. Involuntary attention involves patterns that are difficult to dismiss. Placing candy where a child can easily spot it at the supermarket checkout counter exemplifies marketing that takes advantage of this type of attention. In fact, many of the objects that captivate children are good examples of things that attract their involuntary attention: soap bubbles, balloons, butterflies and bouncing balls. Kaplan‘s

examples include similar objects: ―strange things, moving things, wild animals, bright things, pretty things, words, blood, etc.‖ (McPeek, 2004, p. 1267). These objects stimulate a kind of attention that requires no effort on the subject‘s part; this attention results as a reaction to one‘s surroundings (Berman, Jondies, & Kaplan, 2008; Kaplan & Kaplan, 1989; Ulrich, Simons, Losito, Fiorito, Miles, & Zelson, 1991b).

Voluntary Attention

Contrastingly, forcing oneself to pay attention to something that is not particularly interesting requires a good deal of effort. Though Kaplan called this kind of attention ―voluntary,‖ this terminology has created a good deal of confusion; thus, many authors instead adopt the expression ―directed attention‖ (Berman, Joindes, & Kaplan, 2008). Directed attention is used when an individual chooses to regard particular sorts of stimuli. It is used in circumstances where the stimulus lacks fascination but must be attended to anyway. The modern world, in particular, seems to present many sources of stimuli that are important for people to consider but which fail to hold their interest (Berman, Joindes, & Kaplan, 2008; Kaplan & Kaplan, 1989; Ulrich, Simons, Losito, & Fiorito, 1991a).

When the stimulus patterns required to complete a task are not interesting, one may have to force oneself to pay attention, which results in continuous mental effort. Such mental effort will also surely be required when other stimulus patterns, irrelevant to his or her purpose, are interesting and therefore interfering. Directed attention blocks distractions in order to maintain focused thought (Kaplan & Kaplan, 1982; Paas, 1992). However, after maintaining directed attention for long periods of time, one can feel worn out. Most people have experienced such a state after only a few hours, such as after a

protracted meeting, an intense effort to complete a project, a period of worry and anxiety, or even just a period of trying to do too many things at the same time. This worn-out state in such situations is generally not physical; in fact, these situations frequently include a lack of physical activity. Rather, feeling "worn out" involves what is called "mental fatigue" (Staats, Kieviet, & Hartig, 2003).

Mental Fatigue

According to Kaplan (1995b), directing attention is less about strengthening the focus on what you are trying to do, and more about trying to ignore all of the things that produce distraction. The use of directed attention to block involuntary attention requires a significant amount of mental energy and can lead to mental fatigue (Cimprich & Roins, 2003; Kaplan & Kaplan, 1989).

The most obvious effect of mental fatigue is a decline in one's capacity to force oneself to pay attention. Such fatigue is certainly a manifestation of the cumulative effect of distractions. Not only do people receive too much information, they also do not get enough of the right information (Edmunds & Morris, 2000). It is especially when one has approached this level of fatigue that one becomes aware of the effort that so many tasks require (Marcora, Staiano, & Manning, 2009; Thorndike, 1900). In attempting to conceptualize mental fatigue, it may be useful to describe the inhibitory process which involves the key issue of mental fatigue.

Inhibition does not strengthen mental function but can prevent one from focusing one's voluntary attention. The greatest threat to focused voluntary attention is competition from other stimuli. Avoiding such voluntary attention causes people to direct

attention to other stimuli or ideas. From this perspective, the reason that other interesting or fascinating events can rouse the mentally fatigued individual is that these events are high in involuntary interest and hence do not require voluntary attention. In fact, since the involuntary attention is effortless, the fatigued voluntary attention has an opportunity to recover (Kaplan & Kaplan, 1989).

Mental fatigue seems to result from an increased level of voluntary attention. This would presumably not be a problem when interest and purpose coincide. In a confusing world, however, such a concordance is rare (Chaudhuri & Behan, 2004). As circumstances require a higher level of voluntary attention, people's relationship with the environment begins to deteriorate. The sense of declining effectiveness and rising frustration becomes pervasive as accumulated voluntary attention engenders mental fatigue. Although there is a tendency toward increasing ineffectiveness, the potential results of mental fatigue have largely been ignored (Kaplan, 2001).

Costs of Mental Fatigue

The results of mental fatigue in human functioning are far more omnipresent and more serious than they may seem. It stands to reason that students or scholars who need to concentrate for long periods of time would be disadvantaged by the limitations of mental fatigue (Neumann & Reichel, 1990). However, the general public is affected by mental fatigue in significant ways as there are theoretical grounds for suspecting that mental fatigue can have a destructive impact on society (S. Kaplan, 1987).

According to Kaplan (1995), the costs of mental fatigue might lead to a heightened propensity for "outbursts of anger and potentially…violence" (p.57). The

following research shows how three negative effects of mental fatigue might contribute to aggression.

First, mental fatigue may cause social problems due to its impact on accumulated voluntary attention. Social behavior is likely to become increasingly thoughtless, tactless, and unstrategic, allowing conflicts to spiral out of control. Community and global situations are more likely to generate stress and conflict that is more difficult to resolve. However, if individuals are willing and able to engage in more restorative activities, mental fatigue may be decreased (Kuo & Sullivan, 2001a; Tennessen & Cimprich, 1995b).

Second, mental fatigue may have a negative impact on emotions, resulting in irritability (Drew, 1979). This may in fact be one of the most pervasive costs of the prolonged exertion of mental fatigue. The striking thing about irritability is that it is frequently a hidden cost (White, Thomas, Amess, Grover, Kangro, & Clare, 1995). For instance, when directed attention is necessary for a task, people often think they have performed adequately. However, the cumulative effect of fatigue takes its toll later. According to Cohen and Spacapan (1977), the effects of mental fatigue do not necessarily appear immediately. Sometimes people experience crowds or traffic and manage to save their irritability for later when they are at home. The emotional climate in many households in the late afternoon is testimony to the irritability that has built up in the course of the day for each of the members. Thus, increased mental fatigue can have negative effects on human relationships.

Third, mental fatigue may produce aggression because of its effects on behavior, especially resulting in decreased control over impulses. S. Kaplan noted that one of the

hallmarks of mental fatigue is a difficulty of handling behavioral impulses (S. Kaplan, 1987). This, in turn, is associated with aggression and violence in a variety of populations (Kuo & Sullivan, 2001a). For example, violent parolees tend to be more impulsive than nonviolent parolees; married violent men more impulsive than non-married violent men; and among depressed males, impulsive individuals are more likely to be aggressive than nonimpulsive individuals (Cherek, Moeller, Dougherty, & Rhoades, 1977; Hynan & Grush, 1986; Stanford & Greve, 1995). Not surprisingly, Luengo and colleagues (1994) subsequently found, in their year-long study, that present ratings of impulsivity predicted future antisocial behavior, including aggression (Luengo, Carrillo-de-la-Pena, & Romero, 1994).

Finally, can mental fatigue cause individuals to be prone to "human error?" Unfortunately, even momentary lapses of focus due to mental fatigue can have dire consequences when they occur at critical times. Airplane pilots, ship captains, and operators of nuclear or chemical plants provide vivid examples. For each of these roles, at least one major accident has occurred under conditions when mental fatigue would be predicted to be at a high (Moore-Ede, 1993). In fact, in a study of airline crashes, in which equipment was not at fault, disruptions of sleep schedules for key personnel was a significant factor (Wolfe, 1992). As the work of Broadbent and his colleagues (1982) suggest, a state of mental fatigue may well be at fault in a large percentage of these cases in which accidents are attributed to human error (Broadbent, et al., 1982).

Fortunately, Felsten (2009) wrote not only about the costs of mental fatigue and its causes, but he also wrote about a cure. He suggests that individuals must recover from their mental fatigue, which is best done in a place away from tasks and environments that

might induce it. For example, outside the walls of an enclosed garden, people may experience mental fatigue, whereas inside the garden walls, people can relax and avoid seeing any reminders of the things they need to get done. What they do see is what is inside, most of which should be things that appeal to their involuntary attention. So as long as people can avoid concentrating on their obligations, they will find relief from distraction and restoration in the involuntary attention that the garden incites (Felsten, 2009).

Restoration

Struggling with directed attention in tiring and confusing environments turns out to be central in what is experienced as mental fatigue. If mental fatigue is the consequence of accumulated directed attention, then reducing mental fatigue would seem to be the route to recovery. According to Kaplan and Kaplan (1989), the theoretical background proposed here emphasizes the idea of restorativeness as a perceived quality, in which the physical properties of places must be considered together with people‘s needs and inclinations. Along with their perspective, different research areas in the behavioral sciences have been considered within an interactive framework (Kaplan & Kaplan, 1989).

Restoration is widely studied and frequently discussed in research. It is commonly considered a cognitive process that shows a reversal of the effects of mental fatigue caused by use of directed attention over time (Van Den Berg, Koole, & Van Den Wulp, 2003) and allows for increased critical thinking, concentration, and sustained focus on work (Van Den Berg, Hartig, & Staat, 2007). Also, restoration is an important outcome

of many recreational and leisure programs because it provides people with relief from mental fatigue and an opportunity to avoid some negative aspects of human psychology (Kaplan & Kaplan, 1989).

Research on restoration has often emphasized the potential of restorative environments (Herzog, Maguire, & Nebel, 2003), there is a benefit to be gained from taking a fresh look at restoration. According to Herzog, et al. (1997), restorativeness indicates the psychological benefits of leisure activity, when subjects were asked to identify restorative feelings. Bodin and Hartig (2003) found that running in a park environment promotes psychological restoration to a greater degree than running in an urban environment. In addition, R. Kaplan‘s (2001) study, conducted at six low-rise apartment communities, provides considerable support for the premise that having natural elements or settings in the viewable area from a window contributes substantially to residents' satisfaction with their neighborhood and sense of well-being (Kaplan, 2001).

The positive effects of viewing nature are further supported by Hartig, Evans, and Garling (2003). They claim that one can obtain restoration most efficiently with natural scenes. They were particularly sensitive to the role of ―natural scenery‖ in restoration, arguing that it ―employs the mind‖ without fatigue and yet exercises it, tranquilizes it and yet enlivens it. Thus, natural scenery, for them, produces the effect of refreshing rest and reinvigoration in both the mind and the body.

Restorative Environments

When people have been overwhelmed by directed attention mental fatigue, they might have the impulse to ―get away from it all‖ or ―to escape.‖ These expressions

suggest the need for a change in daily life, but they ignore the fact that the actual location to which they might –escape" is crucial. People can, after all, escape to many places, but they may still fail to achieve the desired recovery. In other words, the location of the –escape" could well be a determining condition for a restorative experience (Hartig, Mang, & Evans, 1991).

Restorative environments research emphasizes the restorative aspects of places, which allow people to relax, to free their minds, and to distance themselves from the daily aspects of modern life (Kaplan & Talbot, 1983). Restorative environments could be realized in a wide range of natural places, including both outdoor and indoor experiences with nature e.g., viewing nature through a window. Recovery from mental fatigue may vary depending on the location, restorative environment or experience, which can be small or vast, brief or more extended (Kaplan, Bardwell, & Slakter, 1993a, 1993b).

Natural Environments

Research on mental restoration has focused on the role of the environment and especially the natural environment (Kaplan & Talbot, 1983). According to Balling and Falk (1982), a natural environment has been defined in terms of the absence of man-made constructions, such as roads, fences, buildings, or power lines, but not in terms of the absence of management. Therefore, certain locations, such as parks or golf courses, can be also considered a natural environment. However, studies using natural environments lacking man-made structures, such as wilderness areas, have been more common and consistent (Scopelliti & Giuliani, 2004).

More clearly, a synonym for the natural environment is a natural setting that can

be defined as an environment partially or totally surrounded with natural elements, so that people can experience an interrelationship with natural elements (S Kaplan, 1995). The realm of natural environments is wider than it may seem to be: deserts and rain forests, or tundra and redwood stands, are clearly quite different from one another in many ways, but all are natural environments. People often respond differentially to various natural environments. Zube, Sell, and Taylor (1982) have reported that the effects of natural environments and man-made visual simulations of nature may be qualitatively different depending on people‘s preferences.

Questions then arise concerning which kinds of natural environments people prefer most. To answer these questions, various dimensions which make up natural elements in a natural environment must be examined. What constitutes a natural element can vary greatly, including a range of flora and fauna, and can also imply inanimate life such as rock, water, and terrain. For example, natural elements may include existing wildlife, plant forms, topography, and geologic environments. Kaplan and Talbot (1983) were interested in wilderness areas that played a significant role in enhancing mental restoration. Herzog (1984, 1989) also used different natural areas, showing more empirical evidence of the restorative effects. According to his findings, evidence of cognitively restorative effects comes from a variety of natural areas. Specific ―natural areas” include natural environments such as mountains, canyons, desert, water, and trees. Among these areas, mountain categories were most favored, while the narrow canyons were liked the least.

Scenic views are also considered within the broader concept of natural areas because much of behavioral research using the natural environment uses visual materials

from nature (Palmer, 2004). Explaining the findings from several studies, Ulrich indicated that simply viewing certain types of nature and garden scenes offers the following positive effects: significantly reduced stress within 5 minutes or less, improved therapeutic outcomes through other mechanisms, such as increasing access to social support, and providing opportunities provided for positive escape from stressful clinical settings (Ulrich, 1981; Ulrich, 1984; Ulrich, et al., 1991a).

In many studies, participants may, for instance, go outside and perform outdoor activities that involve direct contact with various natural areas such as a mountain, river, lake, creek, meadow, forest, etc. On the other hand, people may also appreciate scenic beauty indirectly, say, by watching slides or photos, and still recognize feelings of restoration (Herzog, 1989; Herzog, 1985; Shafer & Mietz, 1970). Aesthetic quality may represent an important factor in restoration. Herzog, Maguire, and Nebel (2003) claim that beautiful scenes of nature typically provide an optimal level of mental restoration. This restorative quality generated by aesthetic natural environments has been examined by preference. So a personal preference for natural scenes seems to arise from the restorative effects resulting from the scenes‘ natural aesthetics (Herzog, Chen, & Primeau, 2002). Focusing on aesthetic qualities, empirical evidence shows a relationship between preference for natural environments and mental restoration. This preference for natural environments is the result of cognitive processes because people‘s judgment of restoration is assumed to be affected by both the perceived characteristics of natural environments and their own aesthetic judgment criteria (Zube, Sell, & Taylor, 1982).

Along with the concept of aesthetic quality, fascinating scenic views may generate people‘s involuntary attention and interests. In other words, natural landscapes

such as panoramic views, which contain diverse natural beauty, seem effortlessly to engage one‘s attention, allowing people to experience the judgment of restoration without the use of directed attention. For this and a number of other reasons, S. Kaplan (1995) suggests that natural elements provide a respite and help resist mental fatigue. The following elements, based on previous research, characterize the major objects of natural scenes.

Water

Many studies have focused on the preferences for water and vegetation combinations. Almost unanimously, studies have shown that water is one of the most powerful elements in enhancing aesthetic judgment and preferences (e.g., Brush & Shafer, 1975; Civco, 1975; Kaplan & Kaplan, 1982; Palmer, 2004; Shafer & Hamilton, 1969; Ulrich, 1981; Wilson, Robertson, Daly, & Walton, 1995; Zube, Pitt, & Anderson, 1975). For this reason, Herzog (1985) used the term ―waterscapes” to refer to natural scenery involving water and different types of wetlands (Herzog, Chen, & Primeau, 2002).

Vegetation

This includes foliage, trees, and forests found in natural environments as well as in wilderness areas. Numerous studies concerning the preference for particular landscapes have also reported that vegetation plays a special role as a specific natural element in enhancing visual preference (e.g., Balling & Falk, 1982; Gallagher, 1977; Herzog, Kaplan, & Kaplan, 1982; R. Kaplan, 1983; Kaplan, Kaplan, & Wendt, 1972; Schroeder & Daniel, 1981; Thayer & Atwood, 1978; Ulrich, 1981; Vining, Daniel, &

Schroeder, 1984). The appearance of existing plants in local parks and nonnatural environments (e. g., work environments with windows) are also important to the visual assessment of a particular natural scene (Kaplan, 1993; Kaplan, 2001; Van Den Berg, Koole, & Van Den Wulp, 2003).

Uneven Terrain

This element implies mountainous natural areas of land located in outdoor places, e.g., mountains, canyons, and desert rock. Used in research as one type of visual, natural landscape, areas of uneven terrain were often acknowledged in people‘s preferences (Herzog, 1989). Mountains were found to be the most preferred landscape in an often-cited study by Calvin et al. (1972). They showed that mountain scenes were relatively well liked. A search of the annotated bibliography compiled by Smardon and Felleman (1982) produced three marginally relevant studies, all dealing with mountains for participants‘ preferences. In addition, Herzog‘s (1984) research provided various types of mountains that people preferred in aesthetic standards.

View Through a Window or Walking

Even a natural view through a window or nearby access to nature has been found beneficial for restoring attention (Ovitt, 1996; Tennessen & Cimprich, 1995a). Tennessen and Cimprich presented two experiments showing that walking in nature or viewing pictures of nature can improve directed-attention abilities. Moreover, Tennessen and Cimprich‘s experiment showed that college students with more views of natural trees and lakes from their dormitory windows scored significantly higher on tests of CDA

(Capacity to Direct Attention). Also, Berman, Jondies, and Kaplan (2008) reported that those who experienced walking in a natural setting or viewing pictures of nature improved mental function in their daily lives more so than those with views of other buildings, a city street, or a brick wall. Similarly, in a study of apartment dwellers, R. Kaplan (1993) and Kahn (2011) found that the presence of an outdoor environment in the view from a window such as trees or woods was beneficial for mental restoration

Restorative Experiences

The results of ~~"r~~estorative experiences" include the removal of mental noise, recovery from mental fatigue, and the enhanced ability to reflect on important issues. Kaplan and Kaplan (1989) used the concept of ~~"r~~estorative experiences" or ~~"r~~estorative effects" to refer to such opportunities for reducing the fatigue of directed attention.

One of the central functions of restorative experiences is to reduce mental fatigue and eventually attain a mental respite and calmness. Certain natural settings feature specific elements that improve opportunities for restoration; for instance, tranquility can produce the benefits of recovery from directed attention fatigue (Korpela, Hartig, Kaiser, & Urs, 2001). Scopelliti and Giuliani (2004) also claimed that a restorative experience refers to an encounter with natural environments. Restorative experience allows people to regain a condition of psychophysical well-being, and effectiveness in daily life. In summary, experiencing nature is indicated as an interactive process in which people undergo restorative experience in the natural environment.

Experiencing Nature

The expression, ―experiencing nature" has been used in various ways throughout research reports and is often associated with any human activity performed around natural environments. In other words, any interactive activity between a human being and natural elements such as walking in a community park, viewing natural scenery on a screen or through the window can be considered as experiencing nature. A walk in an urban park, a trip in the countryside, spending the day at the seaside, etc. are also examples of ―experiencing nature" (R. Kaplan & S. Kaplan, 1989; Herzog, Black, Fountaine, & Knotts, 1997).

The implications of ―experiencing nature" are expressed in natural environment research in the following terms, but these expressions represent an inclusive meaning for ―experiencing nature" rather than illustrating a dictionary definition. Therefore, the meaning of following three terms may be overlapped.

Interaction with Nature

This is a phrase used in research conducted by Kaplan (1984) and Kuo and Sullivan (2001a). They assert that ―interactions with nature" improve directed attention and memory. Berman, Jonides, and Kaplan (2008) also found in their research that one is better able to perform a task that depends on directed-attention abilities after having an interaction with natural environments. Kaplan and Kaplan (1989) pointed out that four components (being-away, fascination, coherence, and compatibility) of attention restoration theory are experienced when interacting with nature. Also, Kaplan (1995) and Berman, Jonides, and Kaplan (2008) supported that interaction with nature may invoke

involuntary attention and cause a subject to consider the meaning of life. Thus, interaction with nature implies an experience that occurs between people and nature.

Contact with Nature

Many studies have used this expression and have demonstrated links between contact with nature and more effective attentional functioning in a variety of populations AIDS caregivers (Canin, 1991), cancer patients (Tennessen & Cimprich, 1995), college students (Kaplan & Kaplan, 1989), prairies restoration volunteers (Miles, Sullivan, & Kuo, 1998), participants in a wilderness program (Kaplan & Kaplan, 1989), and employees of organizations (Kaplan, 2007). Hull and Michael (1995) also claim that positive moods have been linked directly to contact with nature; therefore, it seems plausible that contact with nature could possibly reduce the propensity for aggression. Contact with nature implies a physical meeting between human beings and nature that can offer an opportunity in reducing negative emotions.

Exposure to Nature

Kaplan (1995) used this expression in his attention restoration theory and associated the exposure to natural environments with reduced mental fatigue. Other research suggests that exposure to nature, for instance, such as to a garden or a grassy area with trees, may reduce aggression. R. Kaplan and S. Kaplan (1983) and Well and Evans (2003) also reported that exposure to nature has therapeutic functions for patients with mental health issues and that exposure to nature itself provides the important benefit of maintaining healthy behaviors along with mental health. Thus, exposure to nature can

be interpreted as a situation in which nature affects mental health.

Four Components of Experiencing Nature in ART

Kaplan and Kaplan (1989) theorized that four elements of attention restoration theory are important for achieving restorative experiences: fascination, coherence, sense of being away, and compatibility with inclinations and goals. Because involuntary attention may reduce the consumption of directed attentional resources, some source of interest or fascination is critical to the restorative experience. Coherence is a sense of order that contributes to one‘s ability to make sense of the environment. Being away relates to the sense of escape from sources of mental fatigue rather than a specific place and allows people to feel distant from the concerns that normally occupy their minds. Finally, compatibility with an individual‘s inclinations is required for achieving restorative experiences. Goal-interfering elements of the environment use up attentional resources. This requires that one‘s purposes fit the demands imposed by the environment (Kaplan & Kaplan 1989). Strictly speaking, these factors describe the components of experiences with nature that result in restorative effects.

Fascination

This component is about ―attention-holding power" of nature and restorative effects. Many of the fascinations afforded by nature might be called soft fascination. Clouds, sunsets, scenery, and the movement of the leaves in a breeze – such patterns readily hold the attention as the real objects of nature. Some fascination is so powerful that one cannot at the same time think of anything else. Soft fascination, by contrast,

permits a more restorative mode. The most direct evidence for the availability of fascination comes from viewing nature because appreciating natural scenes including changes in weather and seasons, combines aesthetic appreciation and contemplation in a way that leaves room in the mind for a restorative experience as well (Hartig, Mang, & Evans, 1991).

Coherence

The most basic requirement for this component is a ―sense of order" in the immediately perceived elements of the situation such that the individual perceives interrelatedness of landscape elements. This sense of connectedness results from a mental process in which one builds an organized structure. According to Kaplan and Kaplan (1982), coherence is enhanced by the well-ordered combination of natural elements and given environment, which helps people have restorative experiences. The recognition of organized patterns among natural elements allows people to experience a sense of coherence.

Being Away

This component implies involving oneself in cognitive content different from the usual. Kaplan and Kaplan (1989) initially explained this component by using people's saying ―to escape," because people seeking a restorative experience speak of needing to ―get away from it all," from the routine. The term escape usually refers to an absence of some aspect of life that is ordinarily present. For many people in developed countries, nature is no longer the usual everyday content. As such, nature plays an important role in

helping people get away from their ordinary lives and eventually meets their need to achieve restorative experience.

Compatibility

This final component represents a congruity between one‘s goals and one‘s environment. One might, for example, wish to relax and enjoy the sunset but simultaneously, feel nervous about watching for disturbing mosquitoes. As a result, the degree of restoration may be diminished because the environmental factors are incompatible with the goal. People seem to consider nature particularly high in compatibility with restorative experiences.

Cognitive Benefits of Experiencing Nature

–Experiencing nature” promotes stress relief, positive self-image, fostering of human relationships, and self-reflection. These benefits of experiencing nature vary depending on the focal points of research, all of which are associated with –restorativeness”.

Stress Relief

Research about stress has commonly found that experiencing nature can contribute to reducing stress and promoting positive moods and feelings (Hartig, Mang, & Evans, 1991; Ulrich, 1979; Ulrich, 1981; Ulrich et al., 1991). The Job Pressure Project, which incorporated nature into workplace surroundings, showed lowered levels of perceived stress by employees and higher levels of job satisfaction. The findings

indicated that when employees could access natural elements, such as trees and flowers, they felt that their work was less stressful and they felt more satisfied with their jobs than others who lacked an outside view or who could see only man-made elements from their window (Kaplan & Kaplan, 1989; Kaplan, Talbot, & Kaplan, 1988).

Self-image

Kaplan‘s research provides evidence that links positive self-image with ―experiencing nature‖ (Kaplan, 1974; Kaplan, 1977). Experiences in natural surroundings can enhance participants‘ self-esteem and produce positive impacts on their psychological perspective In one study, participants experiencing nature were significantly more likely than control individuals to reflect positive changes on a set of measures reflecting positive self-images. In addition, among the participants who expressed negative self-assessments, those who were exposed to nature were more likely to demonstrate positive shifts in self-image than the individuals in any of the other samples who were exposed to inner city environments (Lewis, 1995). The results of these early studies provide evidence that psychological changes in self-esteem can result from experiencing nature (Kaplan & Talbot, 1983; Korpela et al., 2001).

Social Integration

Especially for older adults, social integration and the strength of social ties are profoundly important predictors of well-being and longevity. Kweon, Sullivan, and Wiley (1998) studied the relationship between experiencing nature and social interaction among older adults within a neighborhood. In this study, investigators interviewed older

adults from this neighborhood and the results showed that exposure to natural environments predicted both the strength of neighborhood social ties and the sense of community. Although the strength of these relationships was modest, the findings suggest that the characteristics of natural environments can play a role in the formation and maintenance of social ties among older adults (Kweon, Sullivan, & Wiley, 1998).

Reflection

Reflection can be defined as people thinking about themselves, their futures, and what is really important to them in their lives. In fact, describing attention restoration theory, the concept of reflection is introduced as one cognitive benefit of experiencing nature. The Kaplans‘ theorizing claims that reflection has four advantages: clearing the mind of cognitive noise that remains from the task demands of one‘s everyday environment, recovery of fatigued directed attention, the opportunity to think about one‘s more immediate but unresolved personal problems, and the opportunity to reflect on life‘s larger questions such as one‘s priorities, goals, and one‘s place in the overall scheme of life (Kaplan & Kaplan, 1989). According to Kaplan and Kaplan (1989), the ratings about reflections were consistently high after subjects interacted in natural elements. Reflection may be one of the psychological benefits of experiencing nature (S. Kaplan, 1983; Kaplan, Bardwell, & Slaketr, 1993a; Quellette, Kaplan, & Kaplan, 2005).

Tranquility

Tranquility is one kind of restorative experience and also the outcome variable of this study. The origin of tranquility in Western philosophy is rooted in the Greek

Hellenistic philosophy of the Epicurians, Skeptics, and Stoics, where it was thought to be the ultimate goal of life. The origin of tranquility may go back to the pre-Socratic, Democritus, who offered ―*euthymia"* as an important state to be sought. Unfortunately, ―*euthymia"* does not have an exact translation in English, but it is related to a state in which the soul proceeds peacefully and is well settled, disturbed by no fear, anxiety, superstition, or other passions. The idea of *euthymia* is based on atomism; an ancient philosophical theory developed by Democritus explaining that all constituents of the universe consist of very tiny units he called ―atoms." This foundational concept of atomism generated materialism in which gods no longer exist in human life, as a result, Democritus believed that the basic route to remove fear and anxiety and eventually reach *euthymia* does not depend on spirituality but on material and physical function. Epicurus employed this atomistic concept of Democritus, not because he had empirical evidence that it was true but because the atomistic concept appeared to remove people's fear of the gods and of death (Morgan, 2011; Warren, 2004). For Democritus and Epicurus, removing fear and anxiety was important for achieving mental peacefulness and *euthymia*.

Moving into the Hellenistic era, the major philosophical schools were the Epicureans, Stoics, and Skeptics. In each, an important idea of tranquility was discussed as the ultimate *telos* (goal) of life with *ataraxia*, which means ―free from disturbance," replacing *eudaimonia,* ―activity of the soul in accordance with excellence." For the Hellenistic, desires were the fundamental cause of disturbance to the soul. Thus, in order to be free from disturbance, it was necessary to understand the root of the desires, or the belief system that desires rest on. Through the use of reason, beliefs could be undermined and desires would cease to emerge, leaving a soul free from disturbance (Brunschwig &

Sedley, 2003).

In the context of Hellenistic philosophy, Nussabum (1991) calls this use of reason to undermine belief systems upon which desires are based ―therapies of desire" and eventually the outcome of such therapy is tranquility. The Latin translation of *ataraxia* is ―tranquillitas." This Hellenistic therapy of desire is similar to a medical model, where the philosopher was equated with a doctor and the patient's ailment equated with a sick soul. This is, in fact, the Hellenistic's first major premise: people are sick in their souls. And, because of this sickness, they cannot experience *eudaimon* lives.

The Epicureans

This school proposed that the route to *ataraxi*a can be found through maximizing pleasure and minimizing pain through developing a simple life. Epicurus saw two major sources of disturbance in human life. The first was anxiety over the fear of death. The second was fear of the gods and goddesses interfering in one's life. Borrowing from the atomism of Democritus, Epicurus claimed that the universe is entirely material and therefore fear of a painful afterlife (because such an afterlife did not exist) and/or fear of godly interferences should not cause disturbance. Happiness as *ataraxia* could then be found as a life of simple pleasures and avoidance of pains associated with striving for material wealth, status, or power (Warren, 2004).

The Stoics

This school believed that the universe was driven by natural laws, and that humans ought to live according to those laws. Stoics sought to live lives of virtue because

they believed that one is virtuous enough, if his or her life is in accord with nature. And that is happiness. For the Stoics, therefore, virtue was the only thing worth choosing, and tranquility was an outcome of virtuous living. They also saw emotion as a key source of disturbance and as having two movements. The first movement was a natural reaction to an event. The second movement was the emotional response to the natural reaction. For example, jumping at the sight of a spider is a first movement. Experiencing fear is the second movement, only taking place after people have come to believe that spiders are dangerous. Yet, the belief in danger is, in turn, based on a belief that something of value might be lost and it is by altering this root belief that passions or emotions can be extirpated and tranquility achieved. The Stoics recognize the first movement as natural, but fault the second movement because this emotional response is based on culturally-learned passions. The Stoics could control the second movement by extirpating the passions (emotions) through reason. Such an extirpation of desire by controlling beliefs through the use of reason could lead to states of tranquility (Hadas, 1961).

The Skeptics

This school criticized the Stoics because holding a belief (e.g., natural law) is to make a commitment, and this can cause anxiety when someone casts doubt on the belief. For the Skeptics, the route of a soul free from disturbance was to hold all beliefs in suspension. The Skeptics proposed that one should adopt an attitude of indifference to avoid anxieties, and not make judgment on any belief due to its untenable characteristics. Then, people will achieve mental tranquility because they accept any belief as the suspension of judgment (Nussbaum, 1991; Splan, 2011).

Modern Context of Tranquility

In the modern context of restoration, tranquility is a desirable state to achieve. Eliovson (1971) defined it as "peace of mind," escape from the strains of living, the contemplation of nature, and the affection of calmness, serenity, and peacefulness. Russell (1980) characterized tranquility as an affective state of low level arousal combined with pleasure. Herzog and Barnes (1999) studied how people recognize a specific environment which is a quiet, peaceful, and relaxed as an appropriate place to get away from the demands of everyday life.

According to the description of Herzog and Cherinick (1999), tranquility was frequently mentioned after a vacation; when participants returned home, this remembered sense of peacefulness was highlighted by the lack of anything quite like it in their everyday environments. This sense of comfort, this opportunity for "hearing the silence," may seem unlikely to occur when one is surrounded by the hustle and bustle of career and social responsibilities rather than the patterned, soothing rhythms of a natural area (Herzog & Cherinick, 1999). Thus, a sense of tranquility occurs on a deep level requiring a lack of external distraction, and correspondingly produces a lack of internal "noise" (Herzog & Bosely, 1992).

Although tranquility is widely associated with a desire for "peace and quiet," the concept seems to have not received much serious interest in the psychological literature. Tranquility, according to modern literature which uses it as a target variable, can be described by using two major concepts.

Relaxation

Research on relaxation interprets tranquility as a positive and low aroused affection (Russell, 1980). One theory that partially explains tranquil moods is Smith's (1990) ABC (attentional behavioral cognitive) relaxation theory. According to Smith, the states of peace/ being at ease, pleasure/joy, and mental quiet/positive detachments (childlike innocence) appear to have some similar attributes with tranquility. In the withdrawal phase at the first level, stress relief, "disengagement from and decreased awareness" of the world, occurs. In the second level, one enjoys feeling "at ease" and "peace" after recovery and release from tension and conflict. To feel tranquility, one has to get rid of or release desires, tension, and conflict. In the third level, "mental quiet" and "positive detachment," which may be the most similar to tranquility, occur. Mental quiet especially involves withdrawing from the world into inner silence and quiet, whereas positive detachment involves a release from self-referential concerns and burdens (Smith, 1990, 2001).

Serenity

In clinical fields there has been research on serenity, as patients are often facing harsh circumstances, sometimes leading to physical and mental problems. Roberts and Aspy (1993) define serenity as a "spiritual experience of inner peace or calmness that is independent of external events" (p. 146), and, accordingly, developed a serenity scale to evaluate the serenity status of patients. They have identified ten critical attributes, several of which appear to have some similarities with tranquility. According to Herzog and Bosley (1992) and Saltoon (2008), the attribute of serenity which is most reflective of

tranquility is the ability to detach from excessive desires and emotions. In other words, serenity is a cognitive ability to accept situations that one cannot change and thus resign to one‘s fate, eventually overcoming the fear or anxiety of situation.

Structured Emotion as Semantic Quality

Research that uses tranquility as a construct is framed and characterized by attempts in semantic interpretation. Various dimensions and structures are theorized. According to Russell and colleagues (Russell, Ward, & Pratt, 1981; Ward & Russell, 1981), for example, emotional qualities attributed to places can be described by a circumplex model, in which the space is defined by two orthogonal and bipolar dimensions. This affective circumplex model depicts each emotion along continuous dimensions of arousal (y-axis: activation/deactivation) and valence (x-axis: pleasant/unpleasant). All the affective qualities, described by an adjective, are based on a combination of the two main dimensions. ―Exciting,” for instance, ―should not be viewed as meaning either pleasant or arousing alone, but must be seen as meaning the combination of pleasant and arousing” (Russell, Ward, & Pratt, 1980, p. 312). Positive emotional qualities associated with an environment can be characterized either by high or low levels of arousal, and these emotional qualities result either in restorative or exciting experiences. Traditionally, literature on restorativeness has stressed the importance of relaxation, while the role of excitement has remained largely unexplored (Hartig, Mang, & Evans, 1991).

Russell and his colleagues (1981, 1989) showed that tranquility and its several synonyms represent a distinct cluster of affective descriptors as a result of specific

environments. Tranquility was shown to be relatively independent of an excitement cluster (exciting, arousing, exhilarating, etc.) and positively related to a pleasantness cluster (pleasant, pleasing, nice, etc.). It will be valuable to focus on two dimensions of clusters. The terms ~~–c~~alm," ~~–r~~elaxed," ~~–s~~atisfied," and ~~–c~~ontent" appear in the same semantic space in each of these studies. The semantic space appears to be one of pleasantness/low negative affect and disengagement/low degree of arousal. In a follow up study done by Russell, Ward, and Pratt (1981) they found the term ~~–t~~ranquil" to be interpreted as peaceful, calm, placid, pleasant, relaxing, serene, restful, and content. Russell's model, therefore, can be one of the major models used to explain tranquility.

Russell and Snodgrass (1987) called tranquility ~~–a~~ffective appraisal" as a quality of judgment attributed to an environment. It would be interesting to explore how tranquility increases depending on the environment. Especially relevant to modern research on tranquility is the literature on the restorative effects of natural environments (e.g., Hartig, Mang, & Evans, 1991; Kaplan & Kaplan, 1989; Knopf, 1987). These researchers show that escape from everyday stress and strain is a distinct motive for seeking out natural environments, and that restoration from mental fatigue is one of the major impacts of such environments.

Tranquility within Natural Environments

Tranquility seems to be more readily achieved in natural contexts. Herzog and Bosely's (1992) study reported that tranquility is strongly correlated with a preferred environment of nature. R. Kaplan (1984) also wrote that natural settings are often

proclaimed for their capacity to instill a sense of peacefulness and serenity. The concept of attention-restoring experience was based on early evidence of the psychological benefits from natural experiences in healthy individuals. Typically, such experiences were associated with mental tranquility and improved levels of daily functioning (Kaplan & Talbot, 1983).

However, studies of less intense exposures to natural environments also showed psychological as well as physiological benefits. In this pioneering research, Ulrich (1986) showed that patients randomly assigned to rooms looking out on natural scenes after medical surgery showed less psychological distress, took fewer potent analgesics, and had shorter hospital stays than those with views of a brick wall.

Kaplan and Talbot (1983), in their study on the psychological benefits of a wilderness experience, found tranquility to be a dimension of the wilderness experience. In their "Outdoor Challenge" data, tranquility was a topic of frequent mention in participants' journals, appearing in 85 % of the sample. In general, common themes emerged on the same day for many of the participants, and the feeling of tranquility was no exception. By the 5th day of a 9 to 11-day wilderness camping trip, "...individuals express a deep sense of peacefulness and tranquility; they are 'free and happy and relaxed' in their surroundings" (p. 178). The days following build on the initial achievement of tranquility. "Individuals feel better acquainted with their own thoughts and feelings, and they feel 'different' in some way—calmer, at peace with themselves, 'more beautiful on the inside and unstifled'" (p. 178). A solo trip occurred on days 9 to 11 of the trip, and after the initial jitters evolved into enjoyment, participants felt a sense

of increased understanding of the environment and their relationships to their surroundings.

Seeing the impact of a wilderness experience, researchers were interested in finding out how the participants felt once they were back in their normal daily lives. Forty-three "re-entry" journals were analyzed and three clusters emerged from the analysis, one of which was "Nature Tranquility." The Nature Tranquility cluster expressed positive feelings about the woods. People mentioned the stress of dealing with the demands of their everyday lives, but remember the natural area they formally viewed as a peaceful, relaxing environment. In addition, the participants made plans for future trips to return to natural areas because they appreciated privacy and tranquility in their surroundings. People expressed feelings of self-confidence and pride in personal accomplishment, feelings that their initial fears had been overcome, and reactions to the physical stress involved in the trip.

The appreciation of aesthetic wilderness areas may be a primary value of natural experiences. In Shafer and Mietz's (1970) relative rankings, the aesthetic dimension had the highest ranking among physical, emotional, esthetic, educational, and social dimensions. Brown and Haas (1980) also found that the enjoyment of nature contributed to the decrease of mental fatigue. They reported that aesthetic enjoyment was perceived both as being extremely important and much more likely to occur in natural areas than in other environments. In Rossman and Ulehla's (1977) study of psychological benefits associated with natural environments, participants rated the importance of different reward items. For these participants, tranquility was highly valued and was strongly

expected in natural environments. These studies show that restorative experiences are not only associated with feelings of tranquility, such as the ones described in past research on natural environments, but also with enjoyment.

Kidd and Brascamp (2002) have conducted study of ―gardening.” The purpose of their study was to determine the psychological benefits of gardening other than the health benefits of the physical exercise. Findings revealed that gardening serves a wide range of benefits on many levels, including psychological, emotional, social, and spiritual. Surprisingly, the gardeners‘ highest rated satisfaction was not from growing plants, but from achieving an inner sense of serenity. More than 60% of the respondents said their most important reward for gardening was ―peace and tranquility.” In a more recent study, Grahn and Stigsdotter (2003) found that participants rated tranquility items (the peacefulness and quiet that gardening affords) as the most importance sources of satisfaction from gardening.

Coherence

Coherence as Cognitive Procedure

In modern life the immediate environment presents people with the information needed for human survival. The information for human cognitive functioning can be divided into two parts. These can be signs, both verbal (e.g., a street name) and nonverbal (e.g., sound of a door bell), that provide guidance for cognition and behavior (Moreno & Mayer, 1999). Some information may influence feelings and behaviors, having been developed by the accumulation of experiences. Such stored information not only makes it

possible for people to assess a present situation, but also to anticipate what might happen next. The notion of this whole cognitive procedure is called an ―informational approach" with which humans automatically follow some cognitive procedure until they realize or understand the environment (S. Kaplan, 1987).

A ―cognitive map" can illustrate this intellectual procedure in human functioning. It is a compact, orderly collection of knowledge that has been accumulated from personal experiences in specific environments (Kaplan & Kaplan, 1982). Such stored knowledge is enormously helpful for making one's way through an environment and for providing direction to others. The information a person has stored about an environment influences how that environment ―feels" to that person, what is noticed and what is ignored. A cognitive map contains more information than one can perceive at once, and permits one to consider, to anticipate, and to react to possible events (Kearney & Kaplan, 1997).

As discussed previously, humans are accustomed to deciphering environmental factors that provide useful information among accumulated experiences. Herzog (1989) and R. Kaplan and S. Kaplan (1989) explained one critical factor to be the ability to make sense. The ability to make sense out of an environment is perhaps one of the most important factors of cognitive functioning. Humans find a great deal of satisfaction in those things that they are able to recognize and understand about an environment. Sudden danger and sudden opportunity alike are far more easily handled by an organism with well-practiced capabilities and lots of knowledge about one's environment.

An example of the concept of making sense would be a person who is skilled in statistics; for this person, being able to complete a complicated statistical problem can be

a gratifying experience. On the other hand, a person who lacks the necessary knowledge to solve a problem is liable to feel lost, confused, or even frustrated. If a person experiences those types of feelings repeatedly, he or she would be more than likely to develop a strong aversion for statistics. Similar reactions can develop in environments a person considers so unfamiliar that he or she has no relevant knowledge to draw on. In such circumstances, a person is likely to feel extremely uncomfortable or may even experience panic. People tend to prefer environments in which they are able to facilitate comprehension (Tapiero, 2007).

The quality of making sense allows people to extend their comprehension of a given environment. People care about environmental factors on a partial as well as whole level in order to understand structure or organization. The failure to comprehend can be quite discomforting. In fact, the better that viewers are able to make sense of an environment, the more likely it is that the environment is comprehensible, important and pervasive (Kaplan, 1979).

The meaning of making sense includes ―coherence.” Coherence helps people make sense of specific environments. A scene or picture with coherence, for instance, is a scene in which all informational factors are well organized and fit together (Kaplan, 1979). A coherent scene may consist of certain visual factors, e.g., structure, color, brightness, tone, size, texture, and aesthetic quality. Such features may help to delineate a region or area of a given scene. These properties of visual information are supposed to help make sense and facilitate understanding with great speed and little discomfort (Kaplan, 1973).

In exploring human cognition, this study will examine the values of visual and auditory effects, which represent two major variables of coherence because natural scenes and musical sounds may function as coherent forms evoking restorative feelings in one‘s mind. Coherent value is the degree of coherent experience to which visual and auditory factors may generate a restorative effect, such as tranquility (Petche, 1996; Scopelliti & Giuliani, 2004). This study expects that coherent values will foster the feeling of tranquility if the settings provided exhibit visual and auditory coherence.

In a coherent environment, things follow each other in a relatively sensible, predictable, and orderly way. Coherent environments make a cognitive map easier to build and coherent experience may create an experience of a ―whole other world" such as ―immersion" (Hartig et al., 1997). As previously granted, coherence is the workhorse idea behind ―extent." Feeling that the space one occupies has coherence and scope enhances one‘s sense of extent. Kaplan (2001) repeatedly describes extent as creating the experience of a ―whole other world."

On the contrary, incoherence does not produce tranquility, due to the conflicting combination of visual and auditory factors. While an appropriate setting contains factors that make sense and aid in comprehension of the environment that promotes tranquil experience, an incoherent environment is difficult to understand, and can cause negative feelings such as confusion, complexity, anxiety, or frustration (Elivovson, 1971; Herzog, 1985). Incoherent combinations of visual and auditory stimuli might be ineffective for either mental recovery or tranquility. For this reason, the current study predicts that incoherent combinations of visual and auditory settings will cause a decrease in

tranquility scores where music is not coherent with given visual landscape. The study posits that coherent experience, regarding visual and auditory combinations, play a key role in promoting tranquility.

Landscape as Visual Coherence

In this study, visual coherence means visual scenes in which all natural elements fit together well, so that one can easily and clearly understand them. Kaplan‘s own theoretical definition of visual coherence, for instance, defines a visual setting in which the structure and organization are easily understood (1987). Being able to organize what one sees in informational factors, or chunks, is crucial here. With this concept in mind, the ~~“u~~nderstanding or fittingness” of visual factors in a natural setting represent an aspect of coherence.

Sometimes, landscapes depicting aesthetic views of nature may engender a visual coherence, resulting in personal preference because a particular scene has a different impact on one‘s cognitive process and significance depending on the perceived value of coherence. Usually, however, a set of aesthetic natural landscapes may be preferred as the result of increased visual coherence (Herzog & Barnes, 1999). Kaplan (1987) also supports this:

Natural scenes vary substantially in terms of value of coherence which they experience. Variables empirically found to predict preference can be analyzed both in terms of their information-processing implications and in terms of their evolutionary significance. Some of these predictors appear to require fairly extensive information

processing, thus supporting the hypothesis that a rapid, unconscious type of cognition may precede certain affective judgments. Such ties between cognition and affect are understandable in the context of the proposed theoretical framework for environmental preference. This framework not only provides a coherent guide to research but also points to the pervasiveness and significance of aesthetics as a factor in human experience and reaction (p.2).

Sublime Environments vs. Pastoral Environments

Pastoral and sublime are artistic genres that are intentionally designed to evoke different kinds of affective response. This study presumes that pastoral elements may yield more tranquil experience than sublime elements; while pastoral elements are defined as natural environments that represent a peaceful and tranquil rural life, sublime elements may elicit feelings of arousal, awe, or fear, which are not words that are generally associated with tranquility. Sublime factors inspire uplifting emotion because of their beauty, nobility, grandeur, or immensity (Herzog et al., 1997). For example, a sublime landscape may elicit such intense emotional feelings of fear that an individual may need to call on attentional capabilities simply to take a quick look over the edge of a cliff. Other sublime landscapes may cause one to worry about what kind of dangerous creature may be hidden in the nearby fog or clouds. These kinds of efforts may result in increased fatigued attention rather than tranquility and recovery from fatigued attention. Also theoretical claims suggest that sublime environments may be less tranquil than pastoral environments. Prior recreation literature has not considered the role a sublime

landscape may play in the restorative process (Bennett, 2011; Ulrich et al., 1991).

Landscape Type: Pastoral vs. Sublime

The concept of "pastoral image" has been used in many different ways to express the juxtaposition of urban and natural environmental settings (Bennett, 2011). For the purpose of this study, however, a definition of pastoral landscape is defined as a predominately rural and natural-appearing scene with meadows, open areas, and minimal human influence. The concept of pastoral has been the focus of an investigation by R. Kaplan (1984). In this paper she seeks to determine the restorative effects of urban areas as opposed to wilderness, using the term pastoral to describe an uncultivated landscape. Rachel Kaplan, in an effort to define wilderness, includes the pastoral as a benchmark on a continuum between urban and wilderness. S. Kaplan (1987), in a paper investigating the primacy of unconscious cognition, refers to people's preference for park-like settings interpreted as a pastoral setting. He suggests that humans prefer the contents of park-like settings such as water, trees, and foliage because of the likelihood of survival in this kind of setting. In a paper by Van den Berg et al. (2003), the authors used the concept of pastoral, calling it a farm landscape, as a category of landscape type. A farming landscape depicted as a natural area with an unmanaged appearance, showing minimal evidence of human influence, may include elements such as the presence of humans, animals, areas of cultivation, and roughness.

The original concept of sublime started as a psychological experience in Greek and Roman poems but it has evolved into an aesthetic landscape type in modern times.

The modern concept of –sublime" was initially used in America as the combination of Burke's aesthetic view point and popular attitudes about natural environment. This perspective was employed as a unique way to describe the unusual landscapes found on the American continent (Bennett, 2011). An American sublime language was not only used as a way to describe a psychological experience but to describe a natural scene. This view point of the natural environment came to be associated with natural beauty and godliness and allowed the observer to see the untamed wilderness as just as valuable as productive farmland (Opie & Elliot, 1996).

Literature concerning the sublime, defines a sublime landscape as a natural environment that may have the wonder of nature, awe, grandeur, or a large scale.

Music and ART

Although ART proposes that attentional tasks deplete our attention and lead to directed attention fatigue, this theory also proposes that people can restore their attentional capacity with involuntary attention activities that require little effort, such as watching aesthetic natural scenes, or listening to soft music (Kaplan, 1995). So an important structural consideration of the present study concerns the use of musical features. As humans enjoy listening to certain types of music in particular settings (Grocke & Wigram, 2010), utilizing existing musical pieces may cause synergetic effects, provoking restorative experiences similar to those stimulated by viewing natural scenes. Beyond this hypothetic reasoning, musical factors also support ART in terms of the four components.

Fascination

Music can be explained by the concept of fascination. According to Grocke, Wigram, Wesely, Hamlett, and Holmes (2006), fascination with music is observed when participants hum and start to move to music, it also enhances involuntary processes. People tend to hold attention with musical features such as pitch, tempo, and loudness of tones and respond to its exposures. Groux and Verschure (2010) also states music and emotional effect on listeners has long been a subject of fascination and they investigated the relationship between perceptual auditory factors and emotional responses.

Being Away

Kaplan (1995b) claims ―being away" clearly involves a conceptual component and while people usually think of a physical change in place, getting away can also be achieved more conceptually. Kirkpatrick (1943) explained that music can provide the possible change in restorative concept; he reported that music seems to improve production on some attentional and tedious jobs; it relieves boredom, creates better morale, and lessens physical or mental fatigue. Although the preferred music for any particular work place depends on participants' gender, age, and race, listening music tends to mentally move people be some place other than the source of the fatigue. At least for that moment, one can feel that one is far away.

Coherence

Visual experiences of nature may be made more coherent with the addition of music, because listening to music may affect a person‘s ability to make sense of the natural environment. People have created numerous numbers of moving pictures for the public on the world wide web describing the beauty of nature and music. Some kinds of music help people regain psychological and physiological balance. Eggebrecht (1999) studied the psychological effects of music and described how musical effects may contribute to the quality of restorative experience. According to Borglin et al. (2006) and Lundquivist (2009), the experience of some kinds of music, e.g., classical music, creates a sense of meaning and coherence in life. This is because when people listen to such music, they experience coherent feelings; the experience of the musical melody makes sense (Borglin et al. 2006; Lundquivist et al. 2009). For example, when healthy adults listen to 10 minutes of preferred music, their psychological states reveal higher levels of restoration and lower levels of stress. However, research findings also show that music provokes varying affective reactions depending on the genre of music provided (DellaSala et al. 2003; DeWitt & Samuel 1990). Thus, the selection of musical genre may be related to the estimation of restorativeness.

Compatibility

Goron and Bruner (1990) explored this component in regard to music. They explored concepts of compatibility between background music and the preference of the audience. The results reported that the combinations of musical features significantly

affected the evaluation of a message‘s source. In other words, participants responded with varying speeds of cognitive reaction depending on the types of musical keys and tones. The results suggest that action planning was faster with compatible rather than with incompatible mappings (and faster than with no tones). Two-dimensional sensory features were tested by exploring the most compatible set among different combinations.

Classical Music

The perceived experience of coherence can be triggered by music‘s organization and structure. Although the particular genre of music for restoration can vary, classical music is generally considered to be the most restorative genre of music because it often incorporates soothing melodies that have psychological effects on humans, thereby, resulting in peaceful, aesthetic experiences (Baker, Uhlig, Austin, Loewy, & de Bruijn, 2011). People often choose different types of music depending on different objectives of activities. If one wants to be relaxed and calm, classical music might be the right choice. Classical music is believed to reduce stress, depression, anxiety, and even induce activity or sleep (Chalan, 1998; Field, Martinez, Nawrocki, Pickens, Fox, & Schanberg, 1998; McKinney, Tims, Kumar, & Kumar, 1997). A study conducted by researchers at the Graduate School of Art Therapy, Deajeon University, South Korea, tested the hypothesis that music eliminates depression, anxiety, and improves human relationships (Choi, Lee, & Lim, 2008). After 15 sessions, participating groups showed vast improvements in human relationships and overcoming depression or anxiety. The control group, on the other hand, remained at the same levels they started with. This study reemphasized the

notion that classical music holds a healing, psychological effect. Also, classical music is not only said to heal, but also to stimulate the brain, as noted in "the Mozart Effect." This theoretical finding states that listening to classical music can actually make people smarter; or that if children are exposed to it, they can reap gains in accelerated mental development. In fact, children who listened to classical music while working on a test actually scored higher compared to children who worked in silence (Ivanov & Geake, 2003; Rauscher, 2003; Schellenberg, Nakata, Hunter, & Tamoto, 2007).

Furthermore, the masterpieces of famous composers, such as Mozart, Bach, Chopin, Beethoven, Brahms, etc. have been frequently used in research regarding restorative settings (Adorno, 1976; DeNora & Adorno, 2003). There are many disciplines involved in the study of music and its effects on the general listener, e.g., what emotions can be induced in the listener by a specific genre of music? Many types of music have been examined from a psychological and physiological perspective and this study focuses on classical types of music that are found in music and emotion research (Bruscia, 1998).

Classical Music Type: Pastoral vs. Sublime

The concept of pastoral music started from the development of opera during the 16th century as the major Western classical genre. After settings of pastoral poetry in the pastoral genre in the opera, Italian poets and composers became increasingly drawn to the pastoral. As a result, musical settings of pastoral poetry such as cantata and serenade are led by those artists. According to Conticello (1987), in modern times, the concept of pastoral was more concerned with psychology than description; he labeled the work

"more the expression of feeling than [realistic] painting." Landscape architect Hunt (1999) also mentioned in the series of ―Milestones of the Millennium," that people experienced the great outdoors in music. He claimed that pastoral music is depicting a peaceful environment and is inspired by life in rural areas. It also describes colorful images of the seasonal changes. Escaping the civilized world, therefore, has long been done by playing pastoral music as a favorite theme for the audiences. ―calm," ―serene," ―tranquil," and ―peaceful" are the emotional patterns characteristic of what, in music, has often been called ―pastoral" (Campbell, 1942).

On the other hand, the original concept of sublime, as mentioned, started as a psychological experience in Greek and Roman poems but it has evolved into an aesthetic landscape type in modern times (Bennett, 2011).

In music, the phrase ―sublime musical style" was used by Johnson (1986) who conveys the idea of ―sublime" from Handel's music, in the gigantic style with aesthetic quality, but above all, elevating and uplifting mood of performance. He explains sublime music includes not only a grand conception, but also an omnipotent band that convey a feeling dignity or grandeur. Although the original meaning of ―sublime" came from the literature in Greek and Roman era, sublime music may be adapted as a musical context: the notions that the genius of the sublime is ―expansive, as result, it seems to be primitive or natural, rather than refined or artificial" (p.156).

Burke (1990) avoids applying his definition of the sublime to composed music, restricting his comments to such ―musical effects" as the beating of drums, and tolling of midnight bells Kant and Goldthwait (2004), who respected Burke (1990), avoided the

sublime in music, even though they accepted that the emotions had a necessary place in sublime experience, and that, of the fine arts, music was particularly the art of the emotions. Kant and Goldthwait argued, none the less, that music could not, of itself, be the source of sublime feelings, only when allied to the dramatic arts (Le Huray & Day, 1981). In other words, artistic events with composed music could generate sublime impressions. These are aroused when the imagination is elevated to the plane of the infinite, the immeasurable and the insuperable. Sublime music can be defined as an auditory effect that may have the impression of arousal, wonder, awe, and grandeur.

Concluding Comments

The purpose of this study is to examine the internal structure of coherence across the visual landscapes and musical tracks and to assess the perceived tranquility produced by either more or less coherence. For instance, a combination of sublime music and a set of pastoral landscapes may inspire less tranquility than a combination of pastoral music and pastoral landscapes. In other words, this study anticipates that the pastoral scene combined with pastoral music will yield higher perceived tranquility scores than mixed emotional genres such as sublime scenes combined with pastoral music or pastoral scenes combined with sublime music. Finally, in order to investigate how disparate visual and auditory combinations affect the perceived tranquility of participants, this study will test the three hypotheses that follow.

Hypothesis 1

Mean scores on tranquility will be different for participants exposed to the pastoral genre of visual-auditory coherence than for participants exposed to the sublime set of visual-auditory coherence.

Hypothesis 2

Mean scores on tranquility will be lower for participants exposed to a mixed emotional genre of visual-auditory coherence than for participants exposed to non-mixed genres of visual-auditory coherence.

Hypothesis 3

Mean scores on tranquility will be higher for participants exposed to natural scenes with music than for participants exposed to natural scenes without music.

CHAPTER III

METHODS

This study examines the effect of visual and auditory cues on tranquility among students at the University of Utah. In addition, it intends to investigate differences in perceived tranquility inspired by varying levels of visual and auditory coherence within settings provided to participants. This chapter describes the participants, pilot study, measurements, study design, procedure, and data analysis.

Participants

The sample for this study consisted of students enrolled at the University of Utah. Students who participated in the study were enrolled in classes at the university in the summer of 2012. The participants self-reported levels of perceived tranquility throughout the experiment based on exposure to varying visual and auditory experiences. Although the sample was nonrandom, the study made limited inferences from the sample to any population. Rather, study results were generalized to relations among investigational components. In the context of restorative environments research, students are convenient, yet relevant. Students comprised a relevant subject group for this study because they are especially prone to high levels of attentional fatigue (Li, 2009). The minimum age of subjects was over 18-years-old, and they were enrolled as full time students.

Pilot Study

Prior to data collection, a pilot test was conducted as a dry run for the study‘s procedures. A total of 9 people participated in the pilot test. All were students enrolled during the Spring 2012 semester at the University of Utah. Frequencies and other descriptive statistics were examined for information that might suggest modifications to the study‘s design and or measurements. On this basis, no changes were made to the study‘s overall design. However, changes were made to the photo set and measurement tool.

Nine pilot participants viewed six successive sets of DVDs depicting different combinations of natural scenes and classical music, then responded to a 6-item questionnaire for each set of DVDs. Perceived tranquility was operationalized by having participants respond to six items designed to measure tranquility as an affective state, free from disturbance. These items representing tranquility originate from several sources. Russell (1980, 1981), in mapping affective states, finds all six items to fall in the pleasant-low activation quadrant of his circumplex model of emotion. In the physical activity affect scale designed by Lox and colleagues, the terms calm, relaxed, and peaceful load a factor they defined as tranquility (Lox, Jackson, Tuholski, Wasley, & Treasure, 2000). The reliability of six items representing tranquility were examined by Splan (2011). In the pilot test, the total scores of sum and standard deviation for tranquility were examined across six sets of DVDs.

Six Sets of DVDs

Visual presentations were obtained by subscribing to photo and image collections on the Internet. The researcher chose an original set of 100 photos of each type of scene, i.e., sublime and pastoral. In order to make sure the photos corresponded to the given definition, an expert of visual landscape narrowed the original 100 photos to 40 relevant photos of each type in the study validation. Affirmative features of sublime and pastoral landscapes provided the selection criteria for the initial choice of images, which included natural elements such as mountains, vegetation, and water, but no artifacts or animals.

Auditory elements of the presentations were obtained from the classical music collections in the Marriott and McKay Music Libraries at the University of Utah. The researcher chose two types of music, i.e., sublime and pastoral music in the classical genre and an expert of classical music was consulted to ensure the selections corresponded to the defined categories. Again, affirmative features of the two types of music comprised the selection criteria. Also, two sets of DVDs that depict sublime and pastoral scenes without musical accompaniment were incorporated in order to explore the effect of the presence of music. Eight different pieces of music were chosen for sublime and pastoral scenes. Most pieces are composed by prolific and influential composers of the classical period.

Finally, these six sets of DVDs combining visual and auditory effects became the basis for the data collection:

- Set 1: Sublime scene + Sublime music (SS)
- Set 2: Sublime scene + Pastoral music (SP)

- Set 3: Pastoral scene + Sublime music (PS)
- Set 4: Pastoral scene + Pastoral music (PP)
- Set 5: Sublime scene + No music (SN)
- Set 6: Pastoral scene + No music (PN)

Measurement

One hundred two participants watched and listened to each set of DVDs consecutively and assessed their tranquility status after each DVD, using each of the indexes described as follows. All items were placed on a 7-point Likert type scale with the following response categories: 1=extremely disagree, 2=somehow disagree, 3=slightly disagree, 4=neutral, 5=slightly agree, 6=somehow agree, 7=extremely agree. Participants were asked to circle the number that most closely represented their tranquility while experiencing the DVD.

Perceived tranquility was operationalized by having participants respond to six items designed to measure tranquility as an affective state, free from disturbance. These six tranquility items were already used to represent tranquility and derived from several sources. Russell (1980, 1981) in mapping affective states found all six terms to fall in the pleasant-low activation quadrant of his circumplex model of affect. In the physical activity affect scale designed by Lox et al. (2000) the terms calm, relaxed, and peaceful loaded on a factor they defined as tranquility.

1. While watching the (first) DVD, I felt calm.
2. While watching the first DVD, I felt relaxed.

3. While watching the first DVD, I felt restful.

4. While watching the first DVD, I felt peaceful.

5. While watching the first DVD, I felt serene.

6. While watching the first DVD, I felt at ease.

Research participants viewed six DVD‘s each corresponding to a different combination of emotional genres. Because pretest sensitization is the main internal validity threat to repeated measures designs, research participants watched a warm-up DVD for 3 minutes prior to playing the first treatment DVD presentation. Order effects may be another internal validity threat associated with this study‘s design. In order to control order effects, the successive six DVD presentations were counterbalanced in regard to order. Three different treatment orders were randomly selected and the six DVDs were played one of three possible conditions of treatment order for each participant as follows:

Order 1: SN – SS – PS – SP – PN - PP *

Order 2: PS – PN – SP – SN – PP - SS

Order 3: SS – PP – SN – SP – PN – PS

* (Sublime view & No-music -- Sublime view & Sublime music -- Pastoral view & Sublime music -- Sublime view & Pastoral music -- Pastoral view & No-music -- Pastoral view & Pastoral music)

Item Reliability

In order to examine the internal consistency of the tranquility scale, Chronbach alphas for each measure were calculated. Results indicated that each measurement of

tranquility appeared to be highly reliable, ranging from .885 to .954, across the six DVD‘s. Based on this high reliability, six tranquility measures were computed by averaging across the six items.

Design

One by six repeated measures design was used in this study. The manipulated variable was coherence, with the six levels described above, combining various nature scenes – musical genres.

Procedure

Preparation for recruiting students began with reserving a conference room at the Marriott Library during summer session 2012. This reservation was made before the recruitment began. I borrowed an overhead projector, screen, and speakers, and was supported by a library administrative officer. I began to recruit volunteers by walking around the main entrances at the University of Utah‘s A. Ray Olpin Union (south main entrance) and Marriott Library (west main entrance) and engaging students. The recruiting time lasted from 9 am to 12 pm, Monday through Friday. Potential participants were briefly introduced to me, learned about the purpose of the survey, reviewed the IRB approval letter, and learned about the survey process before they were asked if they would like to participate in the study (see Appendix B). Students who elected to participate completed a sign-up sheet with their contact information. The average conversation time was 3 minutes. I sent a reminder message to each participant by email on the day before his or her scheduled survey. Data collection took place in a conference room at the Marriott Library (room: 1705 E) over a period of 9 weeks during summer

session 2012. Sampling days were Monday through Friday and were separated into afternoon (1pm to 2pm) and late afternoon (3 pm to 4 pm) time blocks in order to accommodate the most students. Before the data collection, I introduced myself again to the students and explained the procedures and goals of the study. When students were ready to participate, I provided them with instructions about how and when they could do so (see Appendix D). No participants were offered any type of incentive or reward for participating in the study.

To start data collection, all participants read the cover letter (see Appendix C). I also read it aloud and concluded by asking if anyone had any questions about the study. The cover letter explained the following: (a) the purpose of study, (b) why this study investigated restorative environments, (c) how confidentiality was protected, (d) what a student needed to do if he or she did not want to answer a certain question, (e) how long it would take to complete the experiment, and (f) information on how to contact me with any questions. After obtaining written consent, the questionnaires were handed out (See Appendix A). The total time for obtaining consent did not exceed 5 minutes.

Participants were given (1) a hard copy of the questionnaire, and (2) six sets of DVDs including slides of natural scenes (sublime & pastoral). In order to familiarize participants with the DVD contents, a 3-minute warm-up DVD was played before the manipulation occurred. After watching each DVD, students responded to the six questions and continued on to watch the next DVD. Watching six sets of DVDs and responding to the 6 tranquility scales took about 50 minutes.

Data Analysis

In this study, three types of statistical methods were utilized. First, data collected from study participants were cleaned and examined for distributional shape and univariate outliers. In addition, assumptions relevant to an analysis of variance for repeated measures were tested, including normality of the variable and homogeneity of variance. Second, demographic data were examined using descriptive statistics to summarize the characteristics of study participants. Demographic variables analyzed included age, gender, ethnicity, major, and degree sought.

In addition, descriptive statistics were also applied for calculating the mean score on perceptions of tranquility, differences within subject, and different scores between the six conditions. Finally, the relation between the perceived tranquility and experiential interventions were examined using repeated measures ANOVA. Statistical package for the social sciences does not allow for user-designed contrasts for repeated measures. Thus, select pairwise comparisons were used to test the study‘s hypotheses. The Bonferonni adjustment was used to control for accumulated error associated with multiple comparisons.

CHAPTER IV

RESULTS

The effect of visual and auditory coherence on ratings of tranquility after exposure to images of nature and classical music were examined in this study. This chapter reports the results of data collected from participants and is broken into five sections: the first section describes the sample; the second section reviews descriptive statistics; the third section provides the results of assumption tests; the fourth section examines the hypotheses; and the fifth section provides exploratory analyses. Although in within-subjects designs participants serve as their own controls, the purpose of these exploratory analyses was to examine the effects of nuisance variables that could serve as rival hypotheses.

Description of the Sample

This study included 102 participants, all of whom were registered students at the University of Utah. The age and gender of participants varied. There were 46 females (48%) and 56 males (52%). The age of the participants ranged from 18 to 39 (mean =24), and 59% were under 24-years-old. They were majoring in 32 different academic fields including biology (9.8%), business (7.8%), mathematics (7.8%), and economics (6.9%).

A sizable plurality of participants was from medium-sized cities (between 50,000 and 500,000: 45.1%). Fewer numbers came from small cities (between 10,000 and 50,000: 27.5%), small towns (between 2,000 and 10,000: 13.7%), large cities (more than 500,000: 5.9%), very small towns (under 2,000: 4.9%) and farms/ranches/rural areas: 2.9%. Forty-one percent of all participants reported that they engaged in nature-based recreation 1 to 5 times a year, 29.4% for 5 to 10 times a year, 12.7% less than once a year, and 10.8% for over 10 times a year. Their favorite music included seven different genres, which included rock (28.4%), classical (23.5%), pop (17.6%), jazz (11.8%), hip-hop and rap (10.8), country (6.9%), and Christian contemporary (1%). Of all the participants, 93.1% reported that they liked the music used on the presentation DVDs, rather than reporting that they felt neutral or disliked it.

Descriptive Statistics

The mean tranquility scores ranged from 4.6 to 6.3, across the conditions. Variability in tranquility scores indicated greater standard deviations and range when sublime genres were presented than when pastoral genres were presented. While the combination of PP showed the highest degree of negative skewness (-1.308) and second highest positive kurtosis (-.931), SP resulted the highest kurtosis (1.869) and second highest skewness (1.202). However, all combination of distribution was acceptable (-.120 < Skewness < -1.308; -.308 < Kurtosis <1.869) because they lied within 1.96 standard deviation of the mean and are used in the construction of approximate 95% confidential intervals. Descriptive statistics for each measurement are summarized in Tables 1 and 2.

Assumption Tests

Two important assumptions for repeated measures analysis are the normality of the distribution and the homogeneity of treatment-difference variances (Maxwell & Delaney, 2004). The assumption of normality requires scores be evenly distributed. As demonstrated in Figure 1 through 6, and Table 2, the distribution of scores for the judgment of tranquility departed from this assumption for three conditions. However, given the rather moderate departures from normality based on the overall pattern of skewness and kurtosis statistics, no data transformations were made.

–Sphericity" test for homogeneity of treatment difference variances was examined (Minke, 1997). The result of Mauchly's test indicated that the assumption of sphericity was violated, χ^2 2(14) = 75, p<.001). Adjusting the degrees of freedom using Greenhouse-Geisser estimates of sphericity (ε=.78) was required.

Hypotheses Tests

The purpose of this study was to examine the internal structure of coherence across the visual landscapes and music types in order to assess their effects on tranquility. Repeated measures ANOVA indicated a significant effect on perceived tranquility when each of 6 different audio/visual combinations were shown to study participants, F (3.89, 393.23) = 80.18, p<.001. Participants perceived a different level of tranquility according to the type of visual and auditory coherence they were shown. In order to investigate how disparate visual and auditory combinations effect the perceived tranquility of participants, this study tested the three hypotheses for mean differences among 6 dissimilar sets of

audio/visual presentations.

Hypothesis 1

This hypothesis stated that tranquility scores for the pastoral genre of audio and visual coherence would be different than tranquility scores for the sublime genre of audio and visual coherence. Repeated measures ANOVA testing revealed a significant difference in the tranquility scores of two types of combinations (Sublime scene and Sublime music / Pastoral scene and Pastoral music), Bonferroni-adjusted pairwise comparison, which supports hypothesis 1. The mean difference between SS and PP was -9.60, which is one of the largest scores of difference among within-subject effects (see Table 3; Figure 7).

Hypothesis 2

This hypothesis stated that the mixed emotional genres of audio/visual coherence, for instance Sublime scenes & Pastoral music (SP) and Pastoral scenes & Sublime music (PS), would provide lower tranquility scores than those of single genre of Pastoral scene & Pastoral music (PP) and Sublime scene & Sublime music (SS) i.e., higher coherence conditions. The result of repeated measures ANOVA testing revealed significant differences in the tranquility scores in all of the four pairwise comparisons. However, two of those comparisons exhibited mean differences in the opposite direction than was hypothesized. The mean difference between PP and SP indicated a lower mean difference score (d = .333) than difference between PP and PS (d = 1.342), but both comparisons

showed a significant difference (see Table 4; Figure7). On the other hand, another homogeneous genre of Sublime scored negatively against the mixed coherence genres. The combination of sublime scenes with sublime music obtained the lowest score among all combinations with music.

Hypothesis 3

This stated that participants who watched natural scenes shown with music would provide higher mean tranquility scores than those who watched natural scenes without music. Repeated measures ANOVA (see Table 5; Figure 7) with 8 Bonferroni-adjusted pairwise comparisons showed an overall pattern in the predicted direction. The sublime – no music condition yielded three out of four significant mean differences, all in the predicted direction. For the Pastoral – no music condition, three out of four mean differences were found to be significant. The pastoral – no music versus pastoral – sublime comparison was not significant. The pastoral – no music versus the sublime – sublime comparison was significant, but in the opposite direction of that predicted. Mean tranquility scores were higher for the pastoral – no music condition than for the sublime – sublime condition (see Table 6).

Exploratory Analysis

This section reports on analyses designed to examine the effects of four nuisance variables that may serve as rival hypotheses for the observed effects. Categorical variables were entered into the repeated measures analyses as between-subjects factors;

continuous variables were entered as covariates. In all cases, the factor by condition interaction was tested. Nonsignificant interactions would indicate that rival hypotheses could be ruled out.

Gender

Because men and women may respond in different ways to visual and musical emotional genres, gender‘s effect on tranquility scores would warrant a condition by gender interaction. Although four combinations (SS, SN, PN, PS) out of six showed higher tranquility mean scores for male participants, the results show no significant difference (sig = .186) between genders (see Table 7). Also, the condition by gender interaction was nonsignificant (p = .16 Figure 8). In interpreting the interaction plots, differences in slopes across the levels of the potential nuisance variable would be suggestive of interaction.

Academic Major (Liberal Arts vs. Natural Science)

Academic training may affect how one reacts to visual and musical genres. One might, for example expect liberal arts majors to be more versed in classical music and to also romanticize nature to a greater extent than those trained in the natural sciences, who might tend to see nature as an object. Such speculations might warrant a training by condition interaction. Results showed that there is no significant difference between academic fields on tranquility scores. Both liberal arts and natural science participants gave PP (Pastoral images and Pastoral music) the highest tranquility rating (M of Liberal

Arts = 6.31, M of Natural Science = 6.33) and SN (Sublime scene-No music) the lowest rating (M of Liberal Arts = 4.61, M of Natural Science = 4.55). The between subjects effect was nonsignificant (p = .44). Further, the training by condition interaction was nonsignificant (p = .52 see Table 8).

Hometown Places (Rural area vs. Urban area)

Participants were divided into two groups by their hometown such as urban and rural areas to examine the effect of where participants grew up in tranquility. Rural areas were defined as farm/ranch lands to small cities (between 10,000 and 50,000 people) while urban areas included medium cities (between 50,000 and 500,000 people), and large cities (more than 500,000 people). The findings about the effect of hometowns showed no significant difference among overall mean scores on tranquility (see Table 9). More specifically, the mean tranquility scores for which participants from both rural and urban areas rated each DVD were fairly consistent (see Table 9). In addition, there was no interaction between two areas where participants grew up (e.g., rural vs. urban) and different sets of DVD presentation on tranquility level (*p*=.12 Table 9).

Recreation Frequency

The study found no overall significant difference among tranquility ratings by participants in separate recreation frequency categories (see Table 10). However, one interesting result showed a prominent difference between the participant groups of "Less than once a year" and "Over 10 times a year" in the PP combination. This implies that

participants who rarely engage in recreation activities (PP = 6.73 in "Less once a year" group) feel more tranquil than those who frequently engage in recreation activities (PP = 5.82 in "Over 10 times a year" group; see Table 10 and Figure 11). Additionally, one notable result was that participants who frequently engaged in recreation activities ("More than 10 times a year" group) only provided higher tranquility ratings for the PS combination than others' groups. As seen in Table 10 and Figure 11, there was a significant interaction between frequency engaging in recreation activities and types of DVD (p=.03).

Effect of Preferred Music on Tranquility

Although the results showed there was no significant difference among tranquility ratings by participants in preferred music categories (see Table 11), people who like country music provided higher scores than those who like other genres of music (see Figure 12). However, the people who like contemporary music were eliminated due to the very small number of sample (n=1). The result also indicated that there was an interaction between DVD combination and preferred music (p=.04) and all participants gave highest tranquility scores to pastoral music with pastoral scenes, regardless of their preferred music genre (see Figure 12).

Effect of Age Group on Tranquility

The between subjects effect was non-significant (p = .10). Further, three age group (teens, twenties, and thirties) by condition by age group interaction was significant

(p=.03) (see Table 12 and Figure 13). The study especially found significant differences between the group of teens and the group of thirties. The teens feel more tranquil than the thirties in the PP and SS combinations.

Table 1 Descriptive statistics associated with tranquility scores for each DVD (n=102)

DVD	Min.	Max.	Mean	SD	Skewness	Kurtosis	Chronbach's Alpha
PN1	3.0	7.0	5.2	.83	-.120	-.308	.885
SN2	1.8	6.8	4.6	1.08	-.191	.177	.923
PS3	1.5	7.0	5.0	1.18	-.409	-.123	.950
SP4	3.2	7.0	6.0	.72	-.931	1.869	.894
PP5	3.8	7.0	6.3	.72	-1.308	1.202	.902
SS6	1.0	7.0	4.7	1.24	-.562	.247	.954

PN1: Pastoral scene & No music; SN2: Sublime scene & No music; PS3: Pastoral scene & Sublime music; SP4: Sublime scene & Pastoral music; PP5: Pastoral scene & Pastoral music; SS6: Sublime scene & Sublime music

Table 2 Normality of Each Condition (Kolmogorov-Smirnov Test n=102)

Combination	Statistic	df	Sig.
PN1	.072	102	.200
SN2	.062	102	.200
PS3	.061	102	.200
SP4	.123	102	.001
PP5	.179	102	.000
SS6	.104	102	.009

PN1: Pastoral scene & No music; SN2: Sublime scene & No music; PS3: Pastoral scene & Sublime music; SP4: Sublime scene & Pastoral music; PP5: Pastoral scene & Pastoral music; SS6: Sublime scene & Sublime music

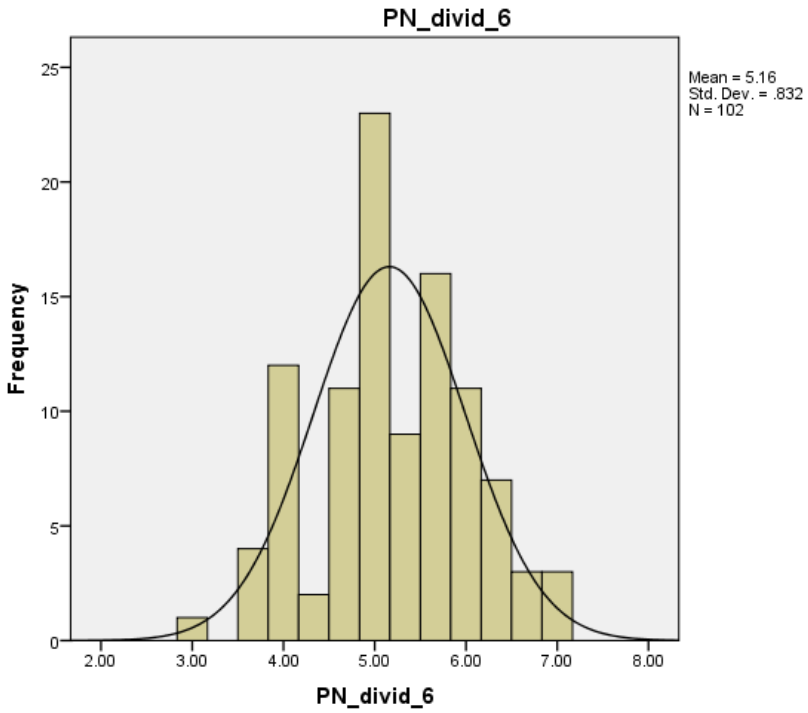


Figure 1 Histogram for Pastoral landscape & No music

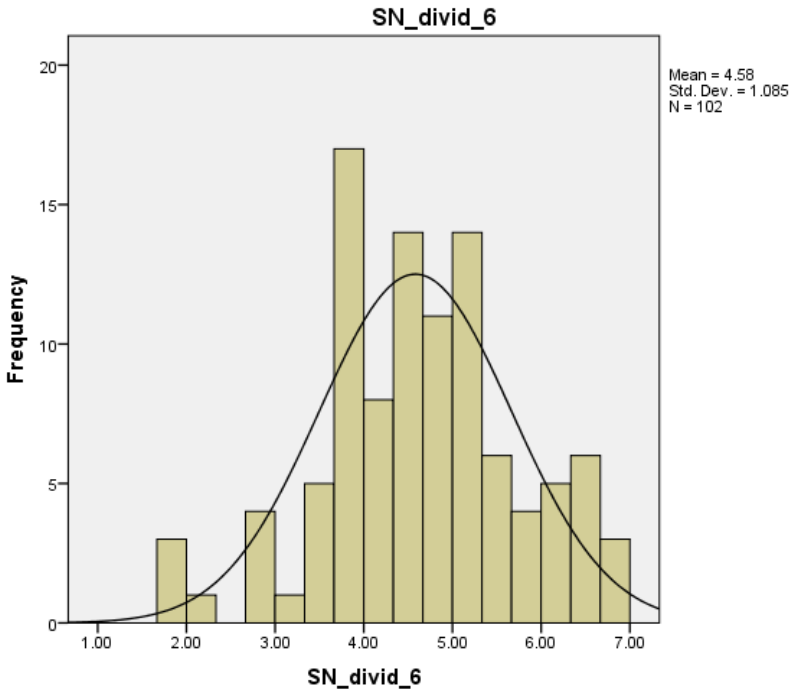


Figure 2 Histogram for Sublime landscape & No music

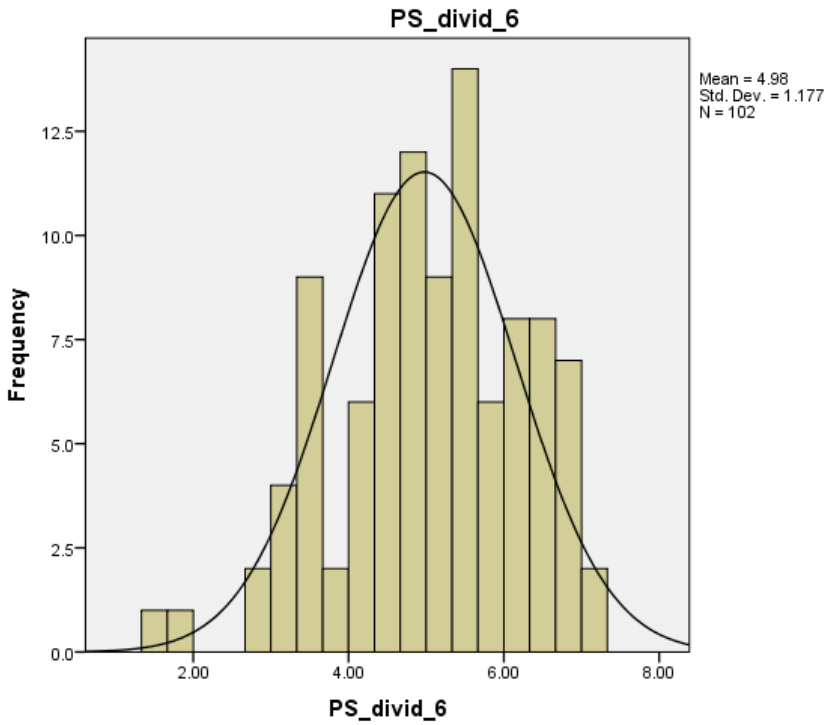


Figure 3 Histogram for Pastoral landscape & Sublime music

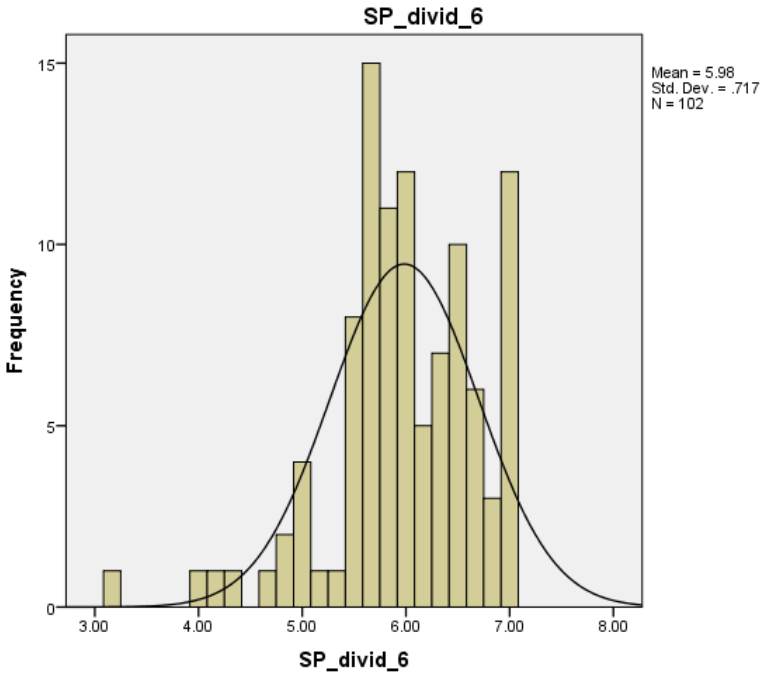


Figure 4 Histogram for Sublime landscape & Pastoral music

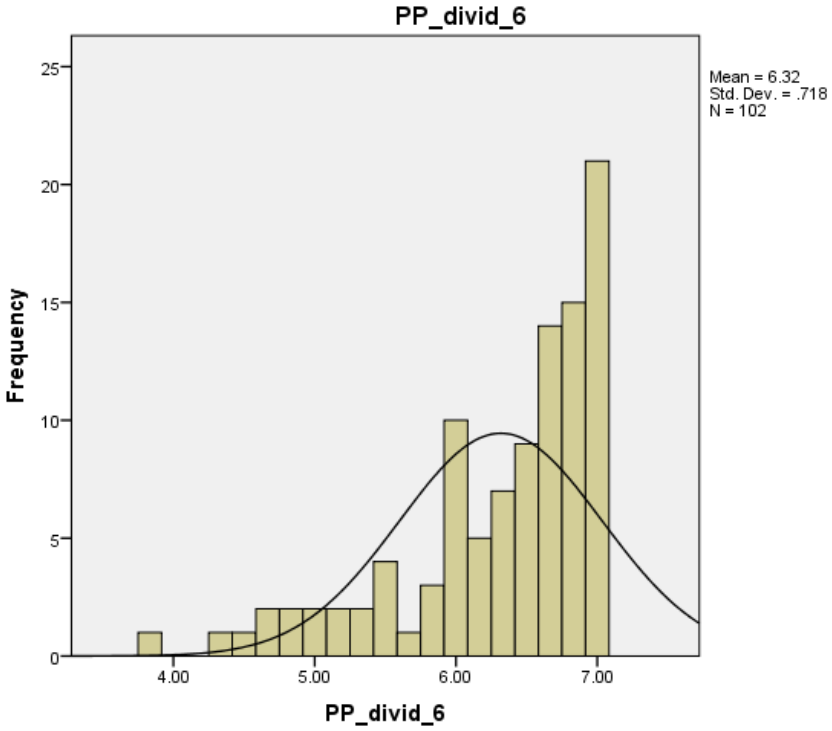


Figure 5 Histogram for Pastoral landscape & Pastoral music

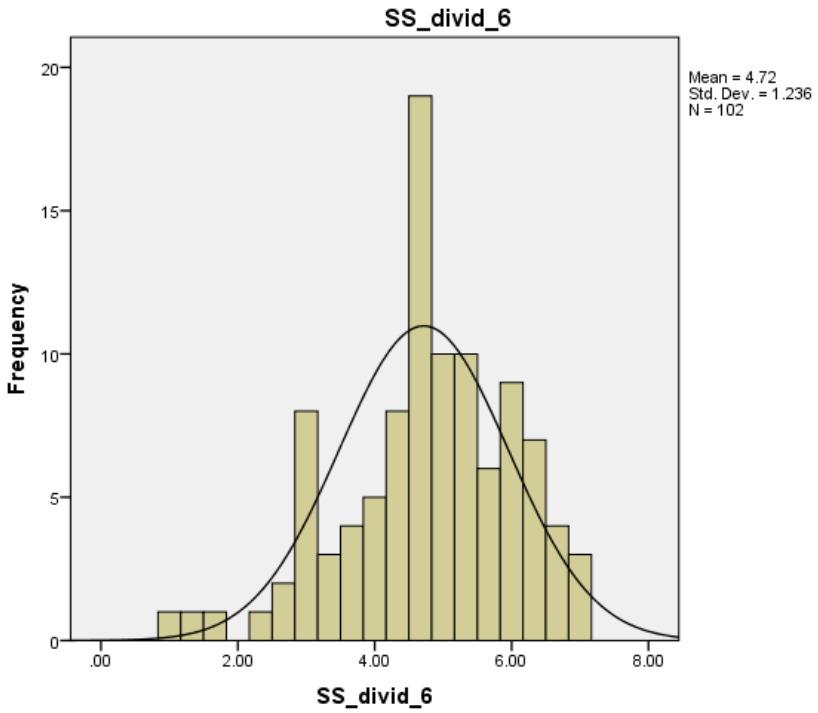


Figure 6 Histogram for Sublime landscape & Sublime music

Table 3 Test of Within-Subject Effect (Comparison between homogeneous genres of coherence n=102)

Combination		d	SE	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
SS	PP	-9.60*	.77	.000	-11.93	-7.29

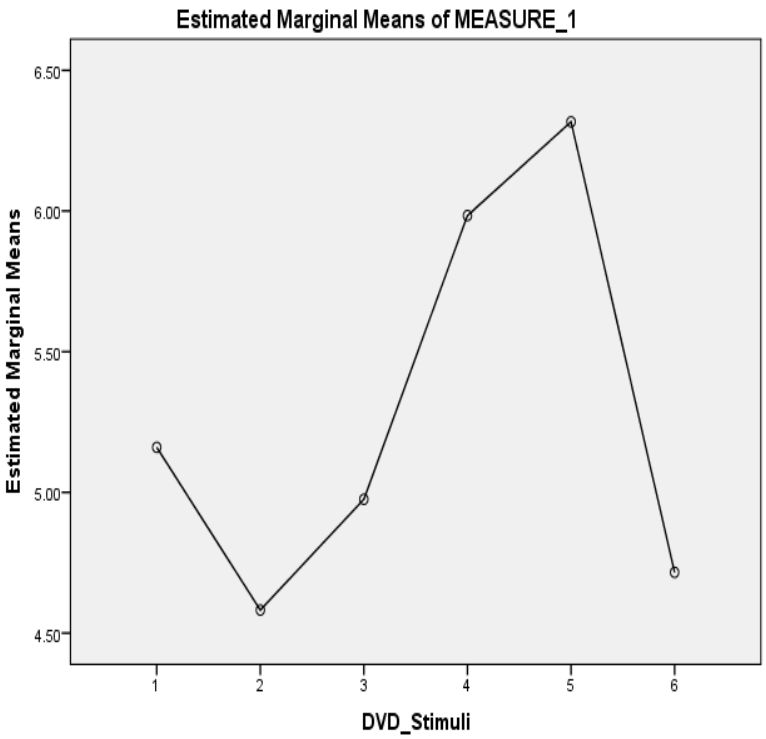
Table 4 Test of Within-Subject Effect (homogeneous genres vs. mixed genres of coherence n=102)

Combinations		d	SE	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
PP	SP	.333*	.069	.000	.197	.469
	PS	1.342*	.116	.000	1.110	1.573
SS	SP	-1.268*	.126	.000	-1.518	-1.018
	PS	-.260*	.105	.015	-.467	-.052

* The mean difference is significant at the .05 level.

Table 5 Test of Within-Subject Effect (combination with No music vs. combination with music n=102)

Combination (No music)	Combination (with music)	d	SE	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
SN	SP	**-1.402**	.119	.000	-1.637	-1.167
	PS	**-.394**	.126	.002	-.664	-.143
	SS	-.134	.114	.243	-.360	.092
	PP	-1.735	.117	.000	-1.967	-1.503
PN	SP	**-.824**	.087	.000	-.997	-.650
	PS	.185	.106	.083	-.025	.394
	SS	**.444**	.121	.000	-.204	.685
	PP	**-1.157**	.092	.000	-1.340	-.974



1 = PN 2 = SN 3 = PS 4 = SP 5 = PP 6 = SS

Figure 7 Estimated Marginal Means of Each Combination of Stimuli

Table 6 Summary of Hypothesis Tests

	Hypothesis	Result
1	Mean scores of tranquility gathered from participants exposed to the Pastoral genre of audio/visual coherence will be different than those gathered from participants exposed to the Sublime set of audio/visual coherences.	Null Rejected
2	Mean scores of tranquility will be lower when gathered from participants exposed to a mixed emotional genre of audio/visual coherence than from participants exposed to the Pastoral genre of audio/visual coherence.	Null partially Rejected
3	Mean scores of tranquility will be higher for participants exposed to natural scenes with music than for participants exposed to natural scenes without music.	Null partially Rejected

Table 7 Gender Difference in Statistics (Between-subjects effect n=102)

Gender	n	M	SD	Sig.
Male	56	5.37	1.16	.186*
Female	46	5.19	.88	

*The mean difference is significant at the .05 level.

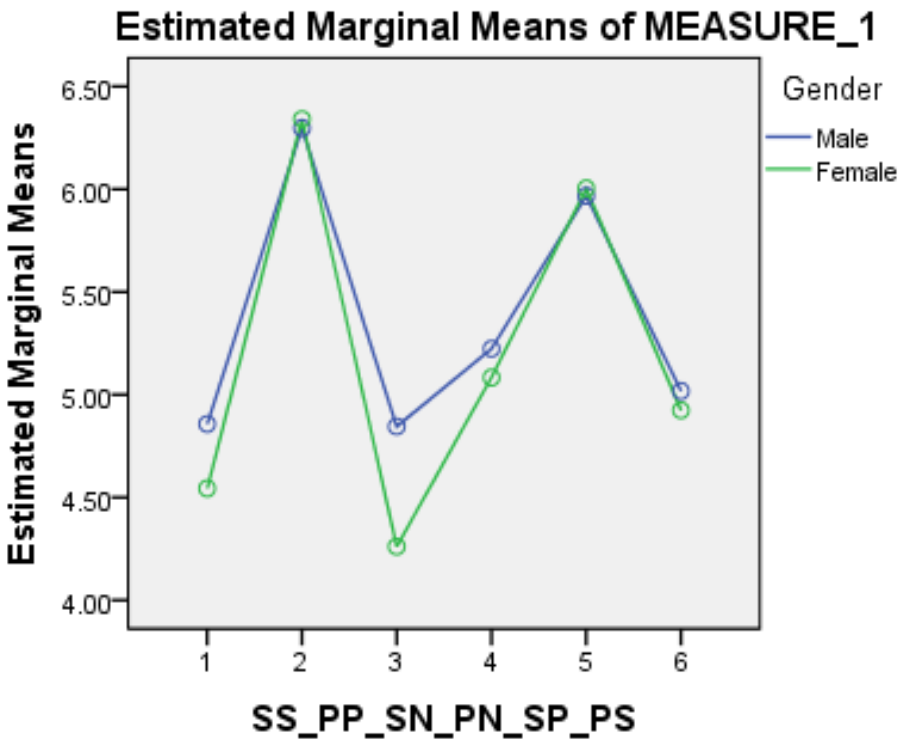


Figure 8 Estimated Marginal Means between Genders

Table 8 Major Difference in Statistics (Between-subjects effect n=102)

Source	SS	MS	F	Sig.	Partial Eta S
Major	56	5.37	1.16	.44	.006

*The mean difference is significant at the .05 level.

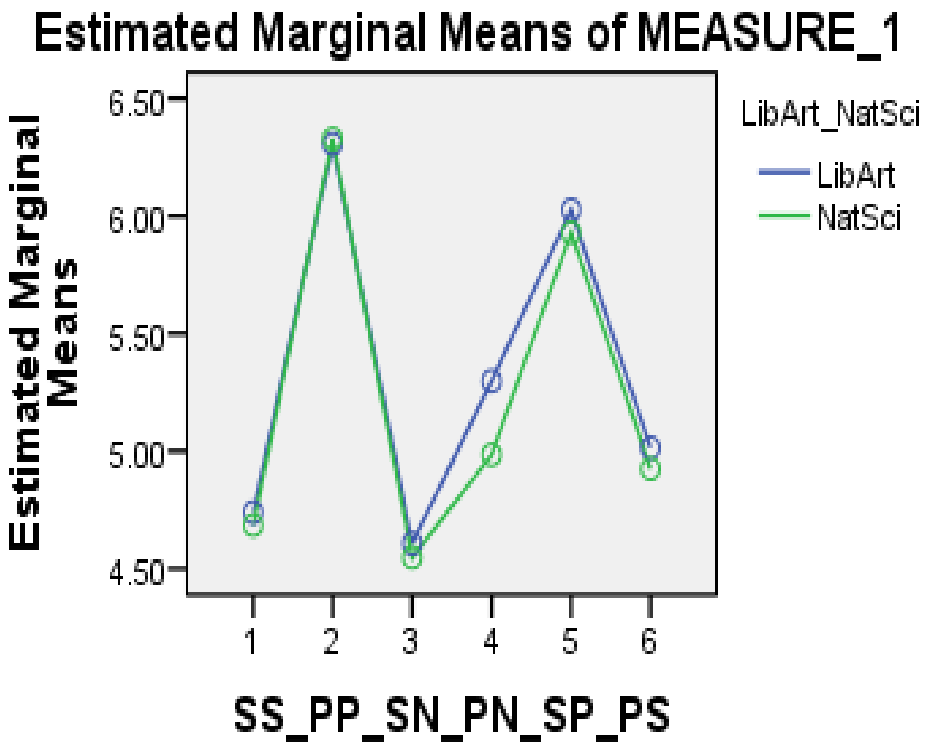


Figure 9 Estimated Marginal Means between Liberal Arts and Natural Science

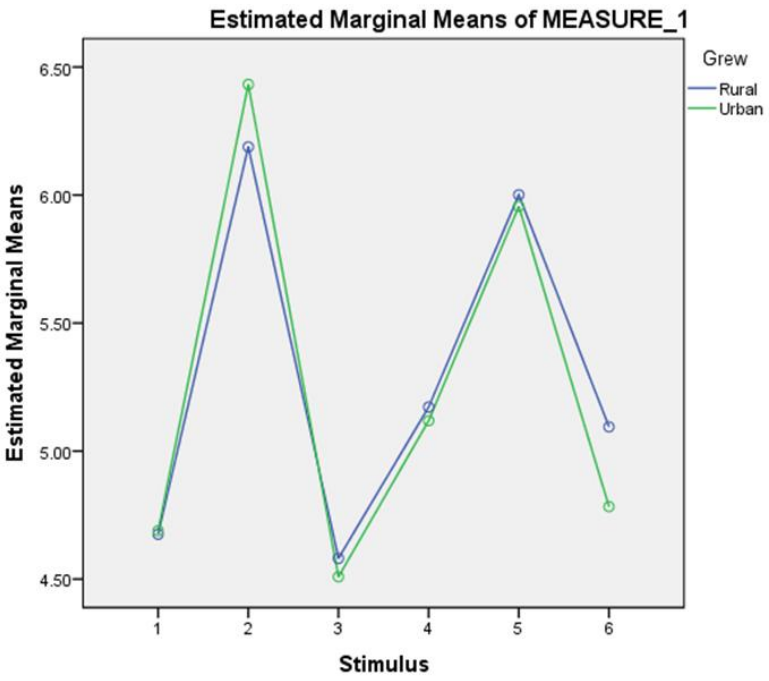
Table 9 Overall differences between Rural and Urban area (n=102)

Hometown places	n	M	d (Rural-Urban)	SE	Sig.*	Partial Eta S.
Rural area	50	5.33	.08	.13	.522	.020
Urban area	52	5.25				

*Adjustment for multiple comparisons

Table 10 Interaction between hometown areas and combinations (n=102)

Hometown	Combinations	M	SE	95% Confidence Interval	
				Lower Bound	Upper Bound
Rural	1	5.20	.12	4.97	5.44
	2	4.66	.13	4.35	4.96
	3	5.18	.16	4.86	5.51
	4	6.01	.10	5.81	6.21
	5	6.19	.10	5.99	6.39
	6	4.74	.18	4.39	5.09
Urban	1	5.12	.12	4.89	5.35
	2	4.51	.15	4.21	4.81
	3	4.78	.16	4.45	5.10
	4	5.95	.10	5.76	6.15
	5	6.44	.10	6.24	6.63
	6	4.69	.17	4.35	5.03



1: PN 2: SN 3: PS 4: SP 5: PP 6: SS

Figure 10 Estimated Marginal Means between Rural vs. Urban area

Table 11 Recreation Frequency Difference in Statistics (Between-subjects effect n=102)

Source	SS	MS	F	Sig.	Partial Eta S.
Rec. Frequency	.32	.318	.119	.731	.001

*The mean difference is significant at the .05 level.

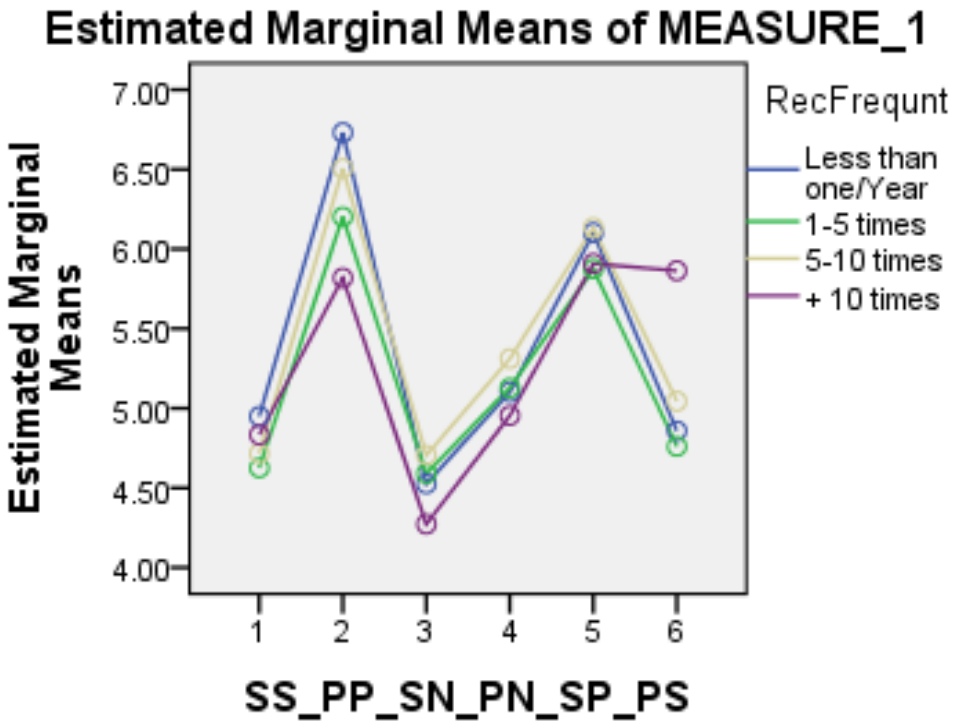
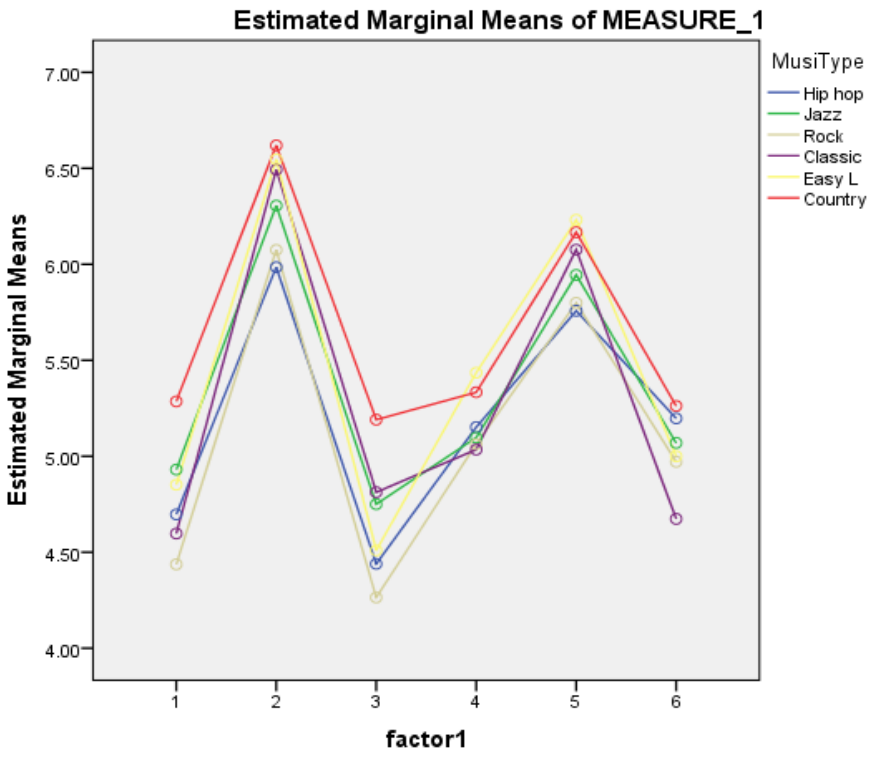


Figure 11 Estimated Marginal Means among Recreation Frequency variables

Table 12 Preferred Music Difference in Statistics (Between-subjects effect n=102)

Source	SS	MS	F	Sig.	Partial Eta S
Preferred Music	8.15	8.15	3.14	.080	.030

*The mean difference is significant at the .05 level.



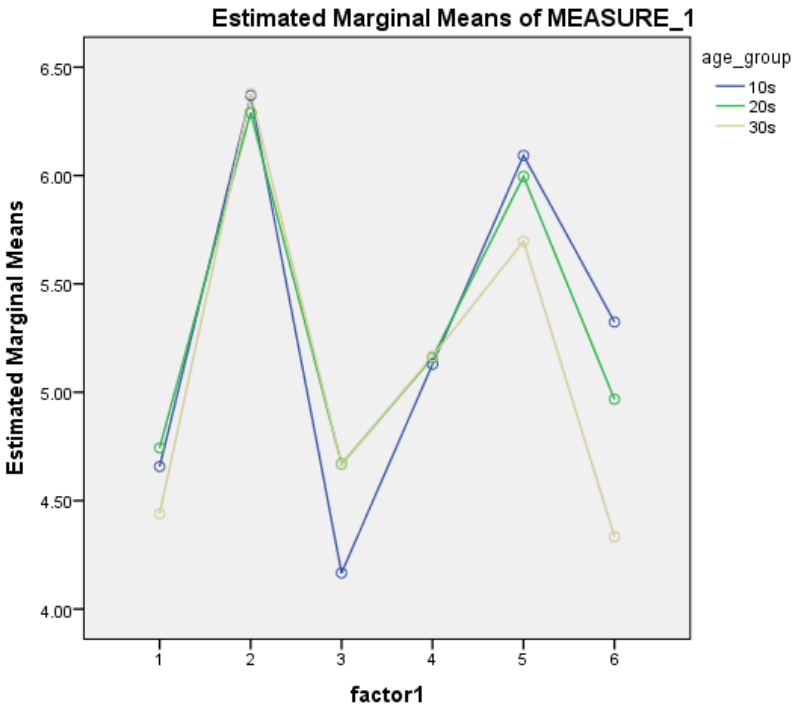
1: PN 2: SN 3: PS 4: SP 5: PP 6: SS

Figure 12 Estimated Marginal Means among Preferred Music variables

Table 13 Age Group Difference in Statistics (Between-subjects effect n=102)

Source	SS	MS	F	Sig.	Partial Eta S
Age Group	2.09	1.04	.39	.678	.008

*The mean difference is significant at the .05 level.



1: PN 2: SN 3: PS 4: SP 5: PP 6: SS

Figure 13 Estimated Marginal Means among Age group variables

CHAPTER V

DISCUSSION

Summary of Purpose and Results

The purpose of this study was to examine the effects of visual-auditory coherence in samples of filmed natural environments on the judgment of perceived tranquility as rated by its subjects. This study was situated within the theoretical framework of attention restoration theory (Kaplan & Kaplan, 1989), examining the internal structure of coherence across visual and auditory stimulation and recording the perceived tranquility produced by different sets of coherence.

Based on a review of the literature, three hypotheses were proposed and tested. The first hypothesis concerned whether or not the pastoral genre of visual-auditory combinations were rated at a higher tranquility level than the sublime genre of visual-auditory combinations. The null hypothesis was rejected, as the pastoral genre of visual-auditory coherence showed significantly higher tranquility scores than the sublime.

In the test of hypothesis II, mixed emotional genres of audio-visual coherence provided lower tranquility scores than those of homogeneous pastoral combination, but the homogenous sublime combination yielded lower tranquility scores than did the mixed genres. This was the opposite of what was expected based on the notion of coherence. It

appears that genre had a greater effect than did coherence, *per se*. The mean tranquility score of sublime scenes combined with pastoral music was higher than pastoral scenes combined sublime music. Therefore, hypothesis II was partially supported.

The results associated with hypothesis III were partially supported. In the visual – no music combination, participants who watched natural scenes with either type of music provided higher mean tranquility scores only in six sets of combination out of eight. However, mean tranquility scores were higher for the pastoral scenes with no music than for the sublime and pastoral scenes with sublime music. Thus, the addition of music did not always result in higher mean tranquility scores.

These results lend support to the notion that less arousing combinations provide tranquil experiences and serve a purpose for people who are seeking a particular kind of visual-auditory setting to achieve restorative psychological outcomes. Even though the more arousing combinations garnered comments on increased enjoyment, this study found that individuals may want to seek out less arousing settings to optimize restorative benefits.

Since the results of this study imply that certain landscape types or musical genres are perceived to contain more or less restorative character, combinations of visual and auditory factors may also produce restorative potential.

Integration with Previous Research

The literature on restorative environments suggests that exposure to certain natural environments may foster psychological well-being because it facilitates rest and

recovery from mental fatigue (Kaplan, 1976). In addition, this literature provides support for the proposition that, on average, natural environments are more restorative than urban environments. Natural environments are those that have minimal or no man-made elements, such as buildings, roads, or human beings (Herzog, Maguire, & Nebel, 2003).

Tranquility, as a kind of restorative experience, is an affective type of restoration that depends on what R. Kaplan and S. Kaplan call "cognitive quiet" (Kaplan & Kaplan, 1989). To reach a point of cognitive quiet an individual must eliminate cognitive clutter and permit recovery of directed attention that many cognitive functions rely upon. When these cognitive capabilities are rested, an individual may move on to restoring deeper, affective faculties. To achieve tranquility, therefore, one has to eliminate or release mental fatigue. This "mental calmness" may be the closest to tranquility, especially because it involves withdrawing from the world into inner silence. Tranquility at this point can be experienced by "making sense" of the natural environment, and realigning priorities to understand the environment, or, in other words, experiencing coherence.

Previous literature has made progress in investigating what role restorative properties, such as coherence, play in the restorative process. Environments with soft fascination may be characterized as environments that possess content that holds an individual's attention (Kaplan, 1984). For example, snow-capped mountains, peaceful ponds, and beautifully colored leaves are examples of soft fascination in natural settings, because they effortlessly hold attention, providing time for relaxation and alleviating mental fatigue (Herzog, 1984). Coherence, which may facilitate a switch from voluntary to involuntary attention, is viewed as an important mechanism of a restorative experience

(Kaplan, 1995). It plays a role in reducing cognitive clutter, thus reducing attentional effort to make sense or experience. Kaplan and Talbot (1983) and R. Kaplan (1984) speculated that coherent structures enable and sustain restorative experiences. Yet, coherence alone may often be short lived. To reach a deeper level of restoration, the combination of two sensory variables may play an effective role. In other words, combined effects may play an important role in sustaining coherence and involuntary attention.

Previous research concerning environmental effects on human psychology has focused on visual and auditory factors producing psychological benefits. Such research on visual perspective is reported in Kaplan‘s theory. Other research concerns the therapeutic effects of auditory factors examined in music therapy theories. Research in the two different areas has found those sensory factors, such as soothing music in the classical genre (Emmerson, 1998) and aesthetic views of nature (Kaplan, Kaplan, & Ryan, 1998), influence people‘s perceptions of mental restoration, as well as their levels of tranquility. The finding that the combination of visual and auditory coherence within a pastoral perspective of the natural environment increases tranquility is consistent with current propositions in the literature on restorative environments. Coherence seems to be influenced by the combination of visual and auditory factors within the natural environment. It produces tranquil experiences from which potential restoration could emerge. Taking this into consideration, the present study appears to be in agreement with the research on the combination of visual and auditory factors in the sampled natural environment, which were found to create tranquil experiences.

This study divided visual and auditory factors into two different genres: pastoral and sublime. Pastoral concepts can be characterized as supportive because of open meadows and the absence of human influences. This confirms the idea that pastoral scenes may also be more restorative and may aid in the rest and recovery of mental fatigue (Bennett, 2011; Kaplan, 1984). So pastoral landscapes, defined as naturally appearing landscapes with meadows, open spaces and minimal human influence, suggest that the open aspects and lack of human influence may be influential in understanding the restorative process (Hammitt, 1982). Kaplan (1987) offers support for the notion that pastoral landscapes may be characterized as restorative. On the other hand, sublime landscapes may include features that would be considered as hard fascination and, therefore, less capable of facilitating tranquil experiences. This may become significant for those individuals seeking natural environments that support the experience of tranquility (Bennett, 2011; Ulrich et al., 1991).

In conclusion, the theoretical basis and actual results of this study provide support for previous research that examined the influence of visual and auditory variables on tranquil experiences in natural settings. Consistent with claims from ART, past studies have found that the presence of coherence influenced the respondents‘ levels of tranquility in the natural environment. Moreover, significant levels of tranquility in the respondents were created where the function of visual and auditory factors were combined. A set of pastoral scenes combined with pastoral music created the highest level of tranquility. Sublime scenes combined with no music produced the lowest level of tranquility, whereas pastoral scenes with no music were rated medium / high. In the set of

two mixed components, musical factors seemed to be more dominant than visual factors: a set of pastoral scenes combined with sublime music earned lower scores than a set of sublime scenes combined with pastoral music. Thus the most influential variable for the tranquility level may be the presence of pastoral music because any type of scene, combined with pastoral music produced the highest levels of tranquil experiences.

Limitations

Several limitations may have influenced the interpretation and generalization of the results of this study. These limitations pertain to method of sampling, location of testing, potential variance of color tone, visual penetration, and ethnicity.

It is common in environmental psychology and restorative environmental research that a study‘s aim is to generalize from study results to relations among constructs and to make inferences from samples to populations. However, the use of sampling college students in this study limits the generalizability of study findings. Although the research randomly distributed flyers in the Student Union building and main library, the findings are not representational of the entire population of students at the University of Utah. All the subjects of the study were willing to participate after reviewing the flyers. They showed their willingness by putting their phone numbers and email addresses on the signup sheet. This limited representation may allow for a sampling bias rather than providing results consistent with the entire population of student groups at the University of Utah.

The location of this study may be another limitation. On-site versus photo

simulation may also have acted as a limiting factor. The use of slides requires the individual to sit in a dark room and slides may not be of sufficient quality to represent an outdoor environment. This indoor setting will only remain an approximation of a real life experience rather than actually providing a natural outdoor setting with natural sound, smells, temperature, textures, or opportunities for walking in the woods (Louv, 2011). In addition, the audio-visual materials are limited in their ability to create a realistic setting, and in their ability to present all the required features of a natural environment. The two-dimensionality of a slide limits the other sensory factors that an individual always derives from an outdoor experience, therefore limiting the way an individual may perceive a restorative environment.

Factors that may account for variance are color tone, seasonal change, ground texture, and visual penetration. Brown or red colors are associated with dryness and a threat to survival in the context of psycho-evolutionary theories of landscape preference (Ulrich, 1983). Scenes with brown versus green tones could have accounted for some variance in tranquility scores. Ulrich (1983) has also shown that uneven ground textures are associated with preference scores. Ruddell, Gramann, Rudis, and Westphal (1989) claim another perspective in ground texture: scenes in the photo set depicted varying levels of ground texture and also may have accounted for some variance in tranquility scores. They showed that as visual penetration into near-view forest scenes increased, preference scores increased. Much of this may be due to the reduced information gathering capacity that screening causes. Reduced information gathering capacities can be associated with negative affective states and thus, reduce feelings of tranquility.

Although this does not pose a threat to inferences that visual coherence is associated with tranquility, such variance may mask the effect size associated with these variables that might have been found in a more homogenous photo set.

There are some hints in the literature of differences in environmental preference of nature among Black, White, and Asian groups of people. Across many studies in distinctly different settings of natural environments, the ethnic comparisons in preference showed relatively high agreement when cultures are similar (Getz, 1982; Kaplan & Talbot, 1983; Schroeder & Daniel, 1981). The University of Utah is predominately White, and I noticed that a majority of the respondents sampled were not people of color. Responses to levels of tranquility and the presence or absence of music may be different for people from different ethnic backgrounds who were not available for this study. Although the age and gender of the sample was somewhat diverse, with age ranging from 18 to 39 and gender including 55% males and 45% females, a more diverse sample of participants that included different ethnic groups would have reduced the influence of this limitation.

Directions for Further Research

Results of this study invite several suggestions for future research. Focusing on different target populations may be one of the possible approaches (Beaupré & Hess, 2005; Kaplan & Kaplan, 1989). Different subject groups may provide other contexts for interpreting the environmental factors used in the present study. For example, sampling in larger cities using subject groups with greater ethnic diversity may influence the

judgment of tranquility, between visual and auditory factors of nature. Different combinations of coherence variables may affect perceived tranquility among samples of ethnic groups having different cultural backgrounds.

Another direction for further research is to organize at more than one level: the concept of the sublime or pastoral genre and its relation to variables of –adventure-excitement pursuing personality" and –eaution-quietness experience pursuing personality" may be examined. In other words, personality and trait variables could be approached with hierarchical linear models.

Manipulating diverse coherent factors in the natural setting via allied human senses may be another possibility for further research. According to Ackerman and Heggestad (1997), human psychology hints at the sensory capabilities that might be stimulated by the natural environment, and many people desire a fuller life regarding their senses stimulated by nature. Human cognitions are catalogued as touch, taste, smell, hearing, and vision. The researcher may be able to create coherent structure by using these sensory factors. It may provide people different restorative experiences,

Results of the present study hint at an important role of listening to preferred music; the more preferred music the respondents listen to, the more positive level they registered (r=.328, p=.001). The use of preferred music for restorative value was studied by (Mornhinweg, 1992). This study identified specific types of preferred music that seem to produce psychological benefits more consistently than others. So exploring the effects of preferred music on perceived tranquility levels is a possible area of further research.

Additionally, there is surely individual variation in how we experience a familiar

environment. The familiarity effect has been demonstrated with environmental features. Familiarity has been divided into four aspects: knowledge, experience, background, and predisposition. Attaining familiarity seems desirable, insofar as it increases comfort and tranquility. It may do so by allowing people utilize their involuntary attention to a greater degree (Kaplan & Kaplan, 1989).

Implications of the Study

The practical implications of this study can be framed by designing and choosing more tranquil environments for their restorative benefits. Examples might include, designing an ideal natural environmental, choosing preferred auditory factors for restoration, or for a simple respite. This study suggests that such environments should provide a coherent environment, and should also produce high levels of tranquility. Therefore one‘s attention and thoughts are not distracted by trying to make sense of the natural landscape and music. This can be a difficult trade off because too much pastoral genre may cause boredom, as well as too much sublime genre can prove unrestorative.

Wilderness with no man-made construction is an excellent example of environments that contain a good balance of visual and auditory factors. Kaplan (1989) claims that wilderness settings are the best shortcut to achieving a sense of restoration, and to feeling one is a part of the natural world. Wilderness is not merely a condition of the place, but also a condition of the mind, evoked by the natural land. With wilderness, what is prominent is also coherent in terms of sensory factors. Finally, these themes unite all natural elements into a larger whole.

Restorative environments seem to be related with the natural environment as well as wilderness areas. However, the expression –natural environment" is not actually restricted to purely natural elements, any more than the –built environment" refers only to constructed elements (Kaplan & Kaplan, 1989). Similarly, the contrast between –natural" and –constructed" on the one hand, and –urban" and –rural" on the other, the current study finds confusing because too much of the previous research is about nature that can be found in urban and rural contexts. Although how –nature" and –natural environment" are used may not be easy to define, they refer to things and places people can still experience.

The results of the present study suggest that the participants who rarely engaged in nature-based recreation reported higher tranquility scores than those who frequently do. The natural environment conveyed in the slides may be functioning more powerfully for the people who have limited access to wilderness areas. For example, people being forced to stay long periods of time in hospitals, nursing homes, homeless shelters, or even in prison may have more restorative experiences with the slide or slide-music combinations than people who frequently visit wilderness areas in person. Ulrich (1984) demonstrated that natural factors are important in hospital patients‘ recovery, and Moore‘s (1981) study showed a dramatic relationship between inmates‘ mental health and their interaction with nature. Therefore, humans should be deeply concerned with health care environments and research should examine the natural environment as a vital source of mental health.

APPENDIX A

QUESTIONNAIRES

Questionnaire, Page 1 (**Practice** DVD)

For each of the items below, please describe how you currently feel by circling the number that indicates your feeling.

1. **I currently feel calm.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

2. **I currently feel relaxed.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

3. **I currently feel restful.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

4. I currently feel peaceful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

5. I currently feel serene.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

6. I currently feel ease.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

Questionnaire, Page 2 (**First** DVD)

For each of the items below, please describe how you currently feel by circling the number that indicates your feeling.

1. I currently feel calm.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

2. I currently feel relaxed.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

3. I currently feel restful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

4. I currently feel peaceful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

5. I currently feel serene.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

6. I currently feel ease.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

Questionnaire, Page 3 (**Second** DVD)

For each of the items below, please describe how you currently feel by circling the number that indicates your feeling.

1. **I currently feel calm.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

2. **I currently feel relaxed.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

3. **I currently feel restful.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

4. I currently feel peaceful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

5. I currently feel serene.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

6. I currently feel ease.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

Questionnaire, Page 4 (**Third** DVD)

For each of the items below, please describe how you currently feel by circling the number that indicates your feeling.

1. **I currently feel calm.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

2. **I currently feel relaxed.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

3. **I currently feel restful.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

4. I currently feel peaceful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

5. I currently feel serene.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

6. I currently feel ease.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

Questionnaire, Page 5 (**Fourth** DVD)

For each of the items below, please describe how you currently feel by circling the number that indicates your feeling.

1. **I currently feel calm.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

2. **I currently feel relaxed.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

3. **I currently feel restful.**

    1. Extremely disagree
    2. Somehow disagree
    3. Slightly disagree
    4. Neutral
    5. Slightly agree
    6. Somehow agree
    7. Extremely agree

4. I currently feel peaceful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

5. I currently feel serene.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

6. I currently feel ease.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

Questionnaire, Page 6 (**Fifth** DVD)

For each of the items below, please describe how you currently feel by circling the number that indicates your feeling.

1. I currently feel calm.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

2. I currently feel relaxed.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

3. I currently feel restful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

4. I currently feel peaceful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

5. I currently feel serene.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

6. I currently feel ease.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

Questionnaire, Page 7 (**Sixth** DVD)

For each of the items below, please describe how you currently feel by circling the number that indicates your feeling.

1. I currently feel calm.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

2. I currently feel relaxed.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

3. I currently feel restful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

4. I currently feel peaceful.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

5. I currently feel serene.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

6. I currently feel ease.

1. Extremely disagree
2. Somehow disagree
3. Slightly disagree
4. Neutral
5. Slightly agree
6. Somehow agree
7. Extremely agree

Questionnaire, Page 8 (**Demographics**)

1. What is your age? _____years

2. What is your major? _____

3. Which of following settings best describes where you grew up? (Please circle)
   a. Farm/ranch/rural
   b. Very small town (under 2,000 people)
   c. Small town (between 2,000 and 10,000)
   d. Small city (between 10,000 and 50,000)
   e. Medium sized city (between 50,000 and 500,000)
   f. Large city (more than 500,000)

4. While growing up, on average how often did you engage in natural-based recreation (e.g., camping, hiking, fishing, river rafting, etc)?
   a. Less than once a year
   b. 1 to 5 times a year
   c. 5 to 10 times a year
   d. Over 10 times a year

5. Are you
   a. Male _____
   b. Female _____

6. What is your favorite kind of music? _____

7. Please make and ~~"x"~~" in the space (use only one) provided that indicates how well you liked the music, over all

_____: _____: _____: _____: _____: _____: _____
Not at all Neutral Very much

APPENDIX B

FLYER

Unique Experience

between Beautiful Nature & Music

(Doctoral Research Survey)

Date: Every Monday through Friday

Place: Inside of Digital Scholarship Lab (Suite 1705 E)

Located next to the Mom's Café (1st level of Marriott Library)

Time: Every playing time is at 1 pm, 3pm, and 4 pm.

(Each session will be lasting for about 50 minutes with 6 DVDs.)

Contact: Jun KIM (801) 879-5822 Email: kim.jun@utah.edu

APPENDIX C

LETTER FOR PARTICIPATION

THANK YOU FOR YOUR PARTICIPATION!

Hello,

My name is Jun Kim, a doctoral student in the Parks, Recreation, and Tourism Department at the University of Utah. For my dissertation study, I am looking at student‘s emotional response in audio-visual setting of nature. My hope is to discover affective level about natural settings with music that will help humans to reduce the mental fatigue.

Your participation in this study will take approximate one hour. There is no foreseeable risk in this study. However, I hope the emotional feedback received for this study may help develop a greater understanding of audio-visual effect in natural settings.

All of the responses you provide are confidential and private. At the end of the study, you will be asked some demographic questions. However, no personal identifying information will be taken from you; only researcher and member of dissertation committee will have access to this information.

If you have any further questions about this study, please call the University of Utah, Department of Parks, Recreation, and Tourism (PRT) at 801-581-8542. Upon completion and publication of my dissertation, the results of this study will be available in bound copy at both the PRT department office and the University of Utah Marriott Library.

If you have questions regarding your rights as a research participant, or if problems arise which you do not feel you can discuss with the researcher, please contact the Institutional Review Office at 801-581-3655.

It is up to you to decide whether or not to take part in this study. If you decide to take part, completion of the study will serve as your ~~“in~~formed consent.” Your participation is by choice. If you are uncomfortable or feel unable to continue participating, you are free to withdraw at any time. There are no costs or compensations for participating in this study.

Again, thank you for your participation.

Jun Kim

Kim.jun@utha.edu

APPENDIX D

GUIDE FOR TREATMENT

Instruction for Treatment

The goal of this survey is to simply explore how much each DVD set affects you: 6 sets of DVD are combined with slides of natural scenes & music (or no music) and you need to concentrate how much the combination of visual-auditory effect goes well together. Each DVD will be showing some repetitive contents but different set of visual and auditory effect will be provided. DVD will be played for about 8 minutes of each, so entire duration you will be watching is about 48 minutes long;

(6 sets of DVD x 8 minutes of each = 48 minutes) Before you start watch, 3-minute of sample DVD will be played in order that you understand how the DVD will be played.

After you finish watching 1st DVD, please put –O" mark as your reaction on 6 questions. Then go ahead to 2nd DVD and so on….

You have to follow the right order as if marked: 1st - 2nd- 3rd - 4th - 5th - 6th

Once you fill out the 6th survey form, you are done. If you have any suggestion or comment to make this test more effective for the participants, please write down on the bottom of this paper. That will be definitely helpful for the upcoming investigation of research.

Any other question, please contact me by this number.

Jun Kim: (801) 879-5822

Thank you again for your participation and hope you enjoy them!

↓ ---------- Suggestion or Comment (Optional) ---------- ↓

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